

Published every Saturday by the Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa., with editorial and executive offices: 30 Church Street, New York, N. Y., and 105 West Adams Street, Chicago, Ill.

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Subscriptions, including 52 regular weekly issues, payable in advance and postage free; United States and possessions, and Canada, 1 year \$6.00, 2 years \$10.00; foreign countries, 1 year \$8.00, 2 years, \$14.00.

Single copies, 25 cents each.

Address H. E. McCandless, Circulation Manager, 30 Church Street, New York, N. Y.

# Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office

Vol. 101

August 8, 1936

No. 6

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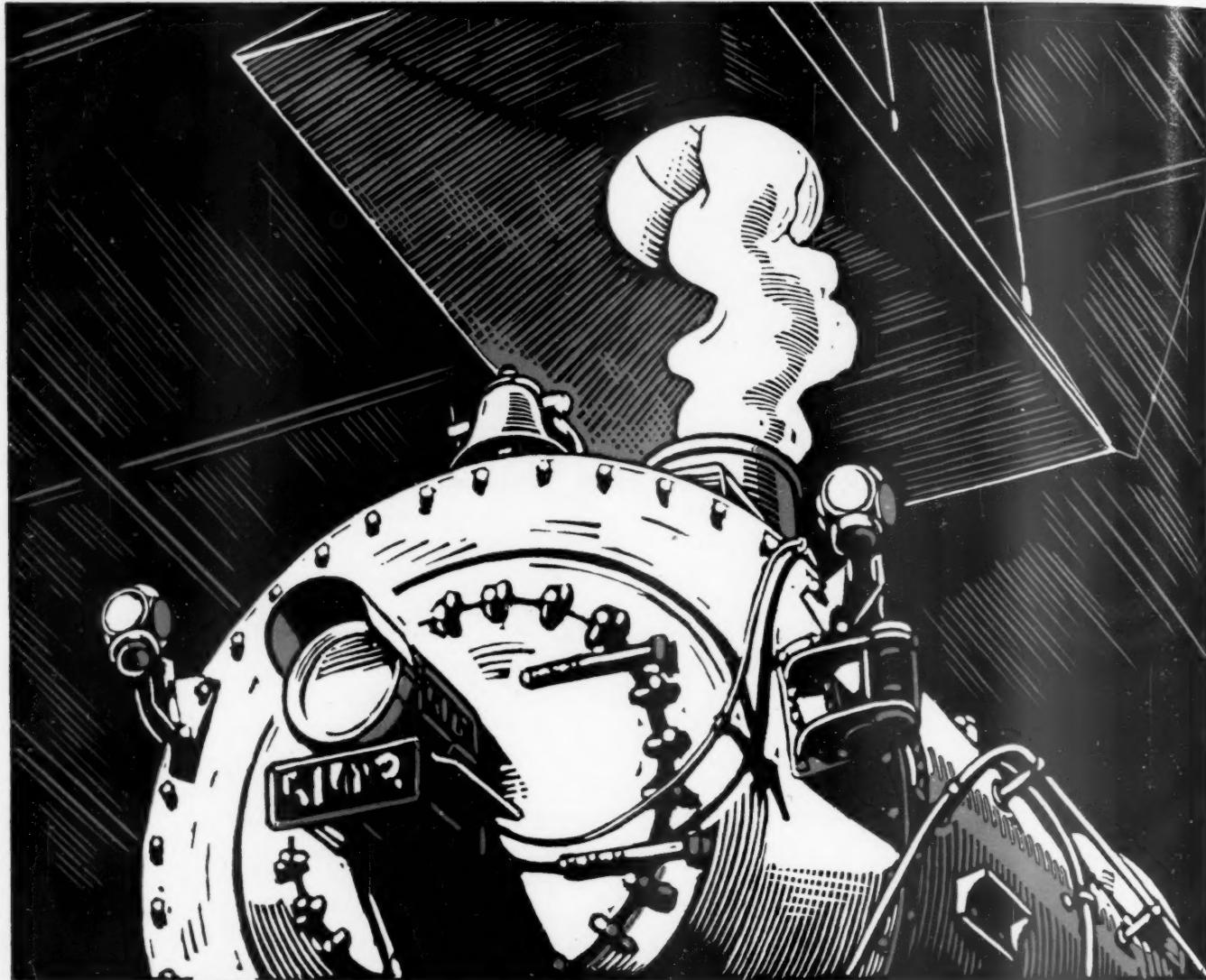
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## RAILWAY AGE

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### Inflation

"Inflation" has been a frequent and important word in economic discussions for three years. Its frequent use was started by New Deal policies intended to advance prices to the level of 1926, which, it was assumed, would reduce the load being carried by those who were in debt. The earliest of these policies were those of going off the gold standard and devaluing the dollar from 100 to 59 cents in gold. Fear and discussion of inflation have been intensified by the policies of vastly increasing federal expenditures, failing to advance taxes correspondingly, and consequently increasing the annual deficit and government indebtedness.

There is no disagreement among competent economists that by these means there has been laid the *foundation* for a more enormous inflation than ever has occurred in the history of this country—an inflation comparable to those which so greatly depreciated the currencies of European countries such as France, Italy and Austria during and after the war, and completely destroyed the value of money in Germany. Whether inflation actually already has begun in this country is a question in controversy. Whether uncontrollable inflation can be prevented if present monetary policies, and policies of government spending vastly in excess of income, are much longer continued, is a much more important and highly controversial question. Unfortunately, most persons do not realize what inflation is, how it can be caused or prevented, or why and how it would affect them. If they did, they would take a much keener interest in the current controversies regarding it.

#### Recovery in the 'Nineties and Now

The monetary policies of the New Deal were expressly and avowedly intended from their inception to cause a "mild inflation" sufficient to increase prices. Since their adoption prices have advanced, but whether owing to these policies is questionable. During natural recovery from a depression prices are always increased by increase in the demand for commodities. There was natural decline and recovery of business during the depression of the 'Nineties. Numerous artificial govern-

ment measures have been tried during the present depression, first to arrest the decline, and later to stimulate recovery. Whatever the reasons, there is a remarkable similarity of the trends prevailing after the bottoms of the two depressions were reached. During the three years following 1894, in which railway freight traffic reached bottom, it increased 18 per cent. During the three years since that ending June 30, 1933, in which it reached bottom in the present depression, it has also increased 18 per cent. During the depression of the 'Nineties prices reached bottom in 1896 and during the subsequent four years increased about 21 per cent. During the present depression prices reached bottom in 1932, and during the subsequent four years have also increased about 21 per cent. The evidence indicates that in both the *natural* economic forces have dominated and determined the pace and measure of recovery.

#### What of the Future?

But some important things have been done and are still being threatened during this depression some of which were threatened but not done, and some of which were not even threatened, during the depression of the 'Nineties. The advocacy of free silver during the political campaign of 1896 was advocacy of inflation by 50 per cent devaluation of the dollar, but it was unsuccessful. During the present depression the dollar already has been devalued 41 per cent. There were no huge government expenditures for public works and relief, and consequent enormous unbalancing of the budget and increase of the government debt, during the depression of the 'Nineties, while there have been both, during the present depression and they are being continued. The facts that railway freight traffic and prices increased as rapidly after the bottom was reached in the 'Nineties as they have since the bottom was reached in 1932 are strong evidence that the New Deal policies of devaluing the nation's currency and enormously increasing the government's expenditures and indebtedness have had no stimulating effects upon recovery—or that their retarding influence

has fully offset their stimulating influence. What of the future?

### Inflation in 1896 and 1936

The *Railway Age* has taken an active part in only one national political campaign. This was in 1896, when it helped to organize railway employees in support of "sound money"; and sound money won. During the next ten years railway freight traffic increased 127 per cent, railway gross earnings 110 per cent, the number of railway employees 83 per cent, and the total compensation paid to them 90 per cent. Such facts show that no mistake was made then by those who then opposed inflation or by the American people in rejecting it. The situation now existing is quite different from that which existed at the corresponding stage of recovery in the depression of the 'Nineties. The combination of the New Deal's monetary and spending policies leads directly toward *uncontrolled* and *uncontrollable* inflation. They constitute, in fact, a threat of much worse and more ruinous inflation than did Bryan's campaign for free silver in 1896. Therefore, it is now much more important even than it was forty years ago for all of the people, including railway employees, to be clearly and fully warned of what inflation is, why there is danger of it and what are its effects.

The moderate and healthy advance in prices which always occurs during recovery from a depression is caused by increase in the demand for property and commodities. Inflation first becomes manifest in the form of a much greater advance in the prices of property and commodities. The much greater increase in prices caused by inflation is not initially due to increase in demand for property and commodities, but to *depreciation in the value of money*. This depreciation in the value of money may be caused by different means. To advance prices by depreciating the value of money was the purpose of the New Deal devaluation of the dollar in 1933. It has had little apparent effect as yet, because most people have not understood its significance enough to begin to fear that their money will become less valuable—that is, may have a declining power to buy property and commodities. Once a large part of the people become afraid that their money will decline seriously in value, they begin a rush to exchange it for property and goods. This immediately starts a great increase in prices—and this is inflation. It causes everybody else to join the rush; and prices then increase so rapidly and much, unless drastic and effective measures are adopted to stop the inflation, that money declines greatly in value, or becomes absolutely valueless as was the case a few years ago in Germany.

### Inflation, Railways and Railway Employees

The effect of real inflation upon all working for wages and salaries should be obvious. The store-

keeper from whom they buy groceries can mark up his prices every day, or even every hour for that matter, in proportion to the decline in the value of money. *But wages and salaries cannot be increased every day or hour.* Consequently, the more inflation there is the more is the purchasing power of salaries and wages reduced. Every form and degree of inflation is equivalent to a corresponding reduction of wages until wages have been increased; and in no country in which real inflation has occurred has it ever been possible to advance *money* wages enough to offset the decline in their purchasing power.

The situation with which the railways and their employees would be faced in case of inflation would be especially difficult. The railways, unlike most industries, are subject to strict government regulation. They could not advance their rates without the permission of the Interstate Commerce Commission after long hearings. They could not advance wages without advances in rates excepting at the price of bankruptcy—a price they would, of course, resist paying to the last extremity. Therefore, probably no class of workers would find it harder to get advances in wages to offset inflation than railway employees.

### How Cause—Or Prevent—Inflation?

How, then, is it likely that inflation would be caused in this country? Probably if it occurs it will be caused principally by continuance of government expenditures greatly in excess of government receipts. The federal government is borrowing most of the money it is spending—borrowing by selling bonds and increasing its indebtedness. There is a limit—nobody knows where—to the amount of bonds it can sell, because there is a limit to the credit of every government as there is to the credit of every individual. It is virtually forcing the banks to buy its bonds now. The more it spends the sooner will come the time when it will have to curtail or stop its issuance of bonds. When that time comes, if its expenditures still largely exceed the receipts it can collect in taxes, it will have to begin printing "fiat" money to pay the excess of its expenditures over its receipts. On the day that begins the people will begin to lose confidence in their money; and on that day uncontrolled and probably uncontrollable inflation will have begun. This has been history in innumerable countries; and we are following straight the road that has led them and their people to inflation and ruin.

The issue of inflation, although in a different guise, is as directly presented to railway employees now as it was forty years ago. All that is necessary to cause it is a continuance long enough of present government monetary and spending policies. These policies have as yet had no appreciable effect in stimulating recovery. But the policy of spending has had the very appreciable effect of causing an increase of billions of dollars in the national debt which is still continuing, and which every

railway employee will have to help pay if it is paid in taxes. If it is not all paid in taxes, it will be largely or wholly paid in printing press money depreciated or made valueless by inflation; and if we get real inflation no group in the country will be more injured by it than railway employees.

How, then, prevent inflation? First, change the government's monetary policies; and, second, stop its orgy of spending.

## June Earnings

Complete totals of earnings for June and the six months reveal an increase of 47.5 per cent in net railway operating income for the month and 22.3 per cent for the six months' period, over last year. Operating revenues in June totaled \$330,691,513, an increase of 17.5 per cent over last year, while expenses (including rents and taxes) increased 13.4 per cent to a total of \$280,378,934. June's total of net railway operating income was exceeded last year in only three months—September, October and November—and this total has not been exceeded in any June since 1933. In that year in June the roads earned net railway operating income totaling \$59,831,292 (or 19 per cent more than in June this year) with gross revenues aggregating only \$278,329,371 (or 16 per cent less than gross revenues in June of this year).

The net railway operating income figure may be likened to the pulse or temperature of a patient. As it fluctuates it tells the tale of the health of a railroad, or of the dollars-and-cents value of the owners' equity in it.

From June, 1933, until June, 1936, railway business improved 19 per cent, but it is evident by comparing the net railway operating income of the two months that others besides the owners got all the increase and \$9,518,713 more besides; there was less left over for the owners after the relatively brisk business of June, 1936, than there was from operations in June, 1933, when the gross revenue was 16 per cent less. The increase in wages, totaling more than 11 per cent, begun in 1934 and completed last year, accounted, of course, for a substantial part of the increase. Then there were over 100,000 more employees at work in June this year than in June three years ago. Total expenses (including rents and taxes) were 28 per cent greater in June this year than in 1933.

The railway "pulse" is improving, and owners may take comfort in net revenue in June which they had to wait for last year until the months of peak traffic. At the same time, it is evident that others besides the owners (employees principally, in higher wages and more jobs), are getting much more benefit from increased railway business than are the owners themselves.

## July Orders in Markets For Railway Equipment

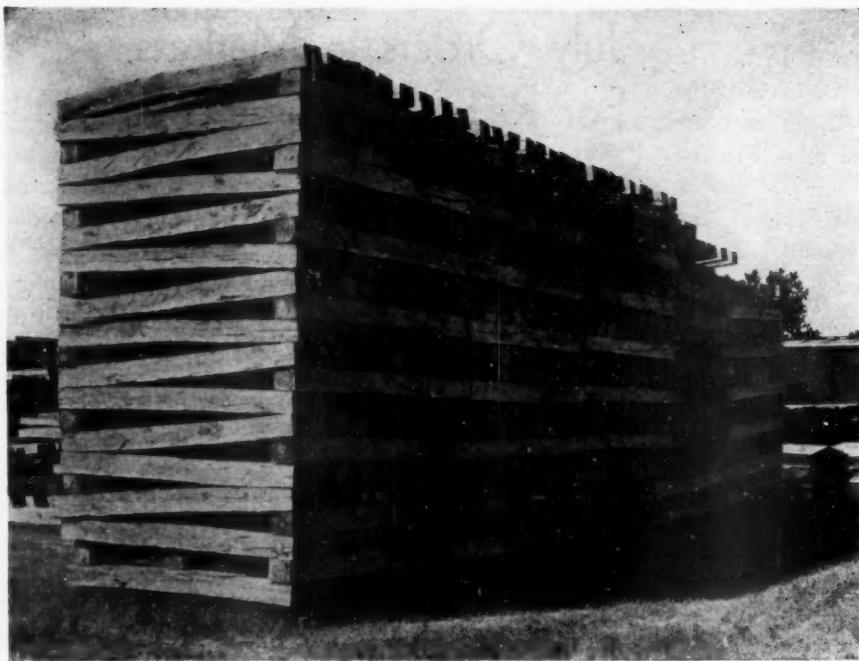
This year's domestic orders for freight cars and steam locomotives, which, as pointed out in the *Railway Age* of July 4, had by the end of June reached totals greater than those for the entire 12 months of any year since 1930, continued to forge further ahead in July. Also, July orders for passenger-train cars made this year's purchases in that connection more than twice as large as those of 1935's 12 months. Finally, with last month's orders for rail, the 1936 tonnage passed last year's 12 months total.

July issues of *Railway Age* reported domestic orders for 4,469 freight cars, bringing the 1936 total to date to 31,029 cars. This is approximately one and two-thirds the total of 18,699 ordered throughout 1935, and, exceeding, as pointed out above, the 12-month figure for any year since 1930, it is about two-thirds of the latter's total of 46,360. In addition there were export orders in July for 110 freight cars, making a total of 516 freight cars ordered here for export this year. This is a better export volume than that reported for the entire 12 months of any year since 1930, save 1934, when export orders totaled 1,323 cars; last year 110 freight cars were ordered here for export. Also there has been reported since the foregoing was compiled an order for 3,000 tank cars, and on August 1 inquiries were outstanding for 575 freight cars, and plans had been announced for the acquisition of 1,000 others.

Nine locomotives were ordered in July—seven steam, one Diesel-electric and one steam-turbine electric. During the first seven months of this year a total of 131 locomotives, excluding power units for streamlined trains, has been ordered. Of these 104 were steam and 27 of other types. As stated at the outset 1936's steam locomotive orders had by June 30 exceeded those of the entire 12 months of any year since 1930. This year's orders for locomotives of all types—131—are about 58 per cent above last year's 12-months total of 83 and, among the five past years, are exceeded only by 1934's 183 and 1931's 176. On August 1 inquiries for 11 steam locomotives were outstanding while plans had been reported for the purchase of three others. Also, there was an inquiry for three locomotives for export.

The 34 passenger-train cars ordered during July brought this year's total to date to 141, excluding articulated units for streamlined trains. This is more than twice the 63 passenger-train cars ordered throughout 1935, and is larger than the total for the entire 12 months of any year since 1930, except 1934 when 388 passenger-train cars were ordered. Inquiries for nine passenger-train cars were outstanding on August 1.

Rail orders reported during July totaled 44,500 tons, thus bringing this year's seven-months total to 512,985 tons as compared with the 495,300 tons placed throughout 1935.



To Prevent Early Decay, Gum Ties  
Must Be Stacked in Open Piles—  
the German Method of Stacking

# Does Gum Wood Make Good Ties?

Some roads refuse to use it; others seek it—A study to determine  
the reason for this difference in attitude

Is gum a suitable wood for crossties? If so, how does it compare with other woods? If not, what characteristics make it unsuitable? Are some species of gum better than others? So far as memory goes there have always been differences of opinion concerning the value of certain woods for crossties, but of all of the timbers available for this purpose the greatest differences, in recent years at least, have prevailed with respect to gum.

As an indication of this wide diversity of opinion, some roads refuse even to consider gum as a material for crossties; others hold their purchases to the lowest point consistent with practical considerations of tie production; while still others accept it, but with hesitation. On the other hand, certain roads accept it freely, while several endeavor to obtain as many gum ties as practicable. Similar differences also prevail among those who use gum ties, with respect to the relative values of the different species of gum for crosstie purposes.

These strongly contrasting attitudes toward a material that is readily available over a wide area at comparatively low cost, inspired an investigation to determine why these differences exist, in which 13 chief engineers and engineers maintenance of way were invited to collaborate. These officers were selected, first because they represent roads which run through sections where the supplies of gum timber are most abundant and have, therefore, a first-hand knowledge of the timber and its characteristics; and, second, because their roads also represent substantially the entire range of practices with respect to gum ties. They by no means include, however, all of the roads that are tributary to supplies of gum wood, or that do or do not use gum for tie purposes.

While, botanically, there are seven species of gum indigenous to the United States, for tie purposes they

may be confined to only three species, namely, black or sour gum, sometimes confused with tupelo; sweet or red gum; and tupelo or cotton gum. It should be borne in mind, however, that there may be considerable differences in the wood from the same species, depending on whether the tree has grown in a swamp, in rich alluvial soil or in poor upland soil. It should also be noted that all varieties of gum decay very quickly after the tree is cut, unless special care is taken to prevent it.

## Practices in Purchasing Gum Ties

Only a cursory investigation is necessary to show that there is a wide diversity in practices with respect to the purchases of gum ties. In the study that was made it was found that 3 of the 13 roads canvassed do not purchase them at all, 1 keeps its purchases to the lowest practicable minimum, while the remaining 9 roads under consideration accept them to the extent of 6 to 30 per cent of their total requirements. It is of interest also that while some of the latter accept all species indiscriminately, others either reject certain species or do not buy them for reasons not connected with their suitability.

Among those that do not buy any gum ties, L. P. O. Exley, chief engineer of the Gulf, Mobile & Northern reported that, "While our experience has been very limited, we did use some creosoted black-gum ties which gave unsatisfactory service, although it was claimed that they were not seasoned properly." The Mobile & Ohio is another road which does not use gum ties, although B. A. Wood, chief engineer of this road, stated, that while "we do not use gum ties, we do use a relatively large amount of treated gum for planking at highway grade crossings and find it very satisfactory." The attitude of the St. Louis Southwestern toward gum ties is

shown by the statement of W. S. Hanley, chief engineer, that "we keep our purchases of gum ties to the lowest possible minimum."

A road which, while not objecting to gum ties, does not buy them for reasons which have no bearing on their suitability, is the Kansas City Southern. According to A. N. Reece, chief engineer, "we have purchased gum ties in only two recent years—1929 and 1932—when they represented 7 and 6 per cent, respectively, of our total purchases." The primary reason for not using gum ties, is that "we are able to fill our requirements with oak ties, beside which the period when gum ties should be cut is generally the rainy season, which makes it difficult to obtain production."

As contrasted with these roads, G. W. Harris, chief engineer of the Atchison, Topeka & Santa Fe system, reported that this road "has applied 2,034,849 gum ties in maintenance during the last 10 years, of which 1,109,388 were hewed and 925,461 were sawed. This total," said Mr. Harris, "is 60 per cent of all of the hardwood ties used for renewals, although it is only 8.8 per cent of the total of 23,092,632 ties used in maintenance during this 10-year period." Although the Texas & Pacific did not purchase any gum ties in 1933 and 1934, R. H. Gaines, engineer maintenance of way, stated that, "we used more than 1,000,000 black and sweet gum ties from 1924 to 1932," adding, however, that his road had "purchased a smaller number in 1935 than in former years."

Likewise, the St. Louis-San Francisco "uses all species of gum, that is, black, red and tupelo, indiscriminately," said F. G. Jonah, chief engineer. A similar belief in the value of gum as a material for ties was implied by K. H. Hanger, engineer maintenance of way of the Missouri-Kansas-Texas, in his statement that "black gum ties at present constitute about 30 per cent of our requirements. A few years ago our purchases of black gum amounted to about 50 per cent of the total, the reason for this reduction being purely the shrinkage of the available supply of this wood." Mr. Hanger added that "we do not use many red gum ties, as those we have used have not been as satisfactory as the black variety."

#### Opinions Differ With Respect to Species

These expressions illustrate the wide diversity of opinion concerning the suitability of gum as a material for ties. It was found, however, that there is an equal diversity of attitude with respect to the relative value of the different species of this wood. As an example, F. T. Beckett, engineer maintenance of way of the Chicago, Rock Island & Pacific, reported that "20 per cent of all of the ties purchased by this road are gum. Formerly, these were divided 18 per cent red gum and 2 per cent

tupelo or black gum. But effective with 1935, the purchase of tupelo gum was discontinued because the timber is light and brash after seasoning, and apparently is unable to withstand wear effectively." A different viewpoint was expressed by A. A. Miller, engineer maintenance of way of the Missouri Pacific, in his statement that "we take from 7 to 11 per cent of our total requirements in gum, making no discrimination between species, since we merely specify gum." On the other hand, according to G. R. Smiley, chief engineer, the Louisville & Nashville "uses only sap-bound black gum, because this timber is equal to any and we believe that it makes the most satisfactory tie we can get."

An instance of non-use of black gum for reasons not connected with its suitability was given by E. A. Craft, engineer maintenance of way of the Southern Pacific lines in Texas and Louisiana, who advised that "about 10 per cent of our crosstie requirements are supplied in sweet or red gum. It is seldom that black-gum ties are offered, since there is a good market for black gum for other purposes, which yield higher prices than can be obtained for ties." He also added that "tupelo gum is not accepted."

A still different attitude toward gum ties was expressed by L. H. Bond, engineer maintenance of way of the Illinois Central, who indicated that while his road has no inherent objection to gum as a material for ties, it desires to clear up certain uncertainties with respect to manufacture and treatment before it commits itself to the use of gum on a large scale. Mr. Bond's comment was that "while gum is not considered a standard material for crossties and switch ties on the Illinois Central, small lots of gum are purchased from time to time for the purpose of studying the best practices in production, seasoning and treatment. There is an abundant supply of gum woods on our southern lines, where most of the hardwoods do not have a satisfactory life, and we are deeply interested in any possibilities for improvement that may be offered by gum."

"We prefer black gum," continued Mr. Bond, "because it resists wear and splitting, has a smaller amount of heartwood than most of the gums, and seasons and takes treatment well. Our second choice is tupelo, which is generally of a much softer texture, although in some cases it is almost impossible to distinguish it from black gum after manufacture. The red or sweet gums are harder to season and treat, for which reason they are accepted only when there is sapwood on each of the four corners of the tie."

Assuming that the reason for this wide diversity in attitude toward gum ties might be found in the results obtained from their use by the different roads, each of

Conditions Like This Breed Infection in Gum Ties



these officers was asked what his experience had been with each species as to life and service and how these compared with pine, red oak, etc. The responses to this question showed wide variations in the results, as has already been indicated in some of the discussions quoted. More specific information from other roads follows.

"Our records make no separation between the species of gum," said Mr. Harris. "The Santa Fe has had excellent results from treated gum ties—about the same as from southern pine and red oak which have been given the same treatment. As in other woods used for ties, however, the amount and placement of the sapwood is important in gum." Likewise, the Rock Island does not distinguish between species of gum in its records of tie-service life. "Our experience with gum ties is, however, that their life is about two years shorter than red oak and about two years longer than pine," said Mr. Beckett.

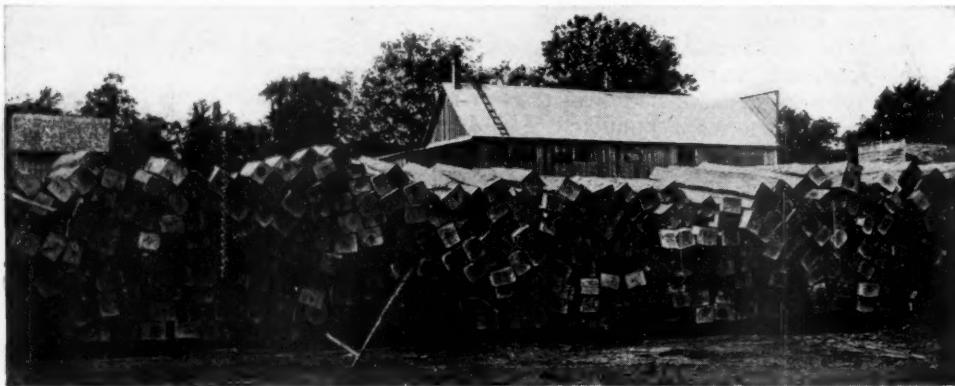
It has been Mr. Hanger's experience that "black-gum ties treated with creosote are as good as, and probably better than pine or red oak treated with creosote. They hold gage better than pine and about the

they do not check badly. For this reason, they do not require S-irons and may, therefore, be sized for length when they are adzed and bored."

An interesting comment on the relative value of the different gums for tie purposes was made by Mr. Craft, who said that "it has been the experience of the Southern Pacific that of the gums, the black variety is the easiest to handle for seasoning, while it takes treatment better, especially into the heartwood. Tupelo gum contains a large percentage of poor timber, is very light in weight, is brittle and is without adequate strength to serve satisfactorily for crosstie purposes.

"The heartwood of red or sweet gum will not take treatment, and we regard sawed ties cut from the heartwood of large red gum logs as not worth the cost of handling and treating. Based on our experience, our specifications limit the acceptance of sweet or red gum to hewn ties or those sawed from trees of such diameter as will permit the sawing of only one tie from a section of the log. In such small trees, the diameter of the heartwood is generally small, permitting a suitable depth of sapwood, which takes fairly good treatment."

Although the Illinois Central is using gum ties to



A Sure Way to Invite Decay in  
Gum Ties

same as red oak. It is our observation that red oak deteriorates somewhat faster than black gum. On the other hand, the exterior rings of black gum are very compact,—although they take excellent treatment, and a few years after installation become very hard; in fact, it is rather difficult to penetrate them with a spike. Failure in black-gum ties usually occurs through deterioration of the heart section."

"It is the experience of the Missouri Pacific," said Mr. Miller, "that when well treated, gum ties outlast pine because of their higher resistance to wear. Yet the heartwood decays rapidly if not penetrated with creosote, and it is practically impossible to get satisfactory penetration of the heartwood of some species." Colonel Jonah reported that the Frisco "gets somewhat better service from black than from red gum, because the former usually contains more sapwood and takes treatment better."

Mr. Hanley stated that "experience with gum ties on the Cotton Belt has been unsatisfactory" and that "as compared with pine and red oak, the life is much shorter." "The Texas & Pacific has not obtained satisfactory results from its gum ties," said Mr. Gaines. "Those we have used had too large a proportion of heartwood and did not take treatment well. In fact, the treatment in the center of the ties, midway between the ends, was insufficient, the result being that many of them are hollow, with an outer shell of treated wood. We think that, in the light of this experience, our handling preliminary to treatment, that is, during the seasoning period, was not as careful as it should have been. Gum ties have a distinct advantage over red-oak ties, in that

only a limited extent at present, "we believe," said Mr. Bond, "that winter-cut gum ties, if carefully seasoned and thoroughly treated with creosote at the proper time, will give a long, satisfactory service on a large part of our lines. Some of our officers believe that they will outlast both pine and oak."

#### Seasoning Important Factor

It will be noted that a number of the foregoing comments emphasized seasoning as a factor affecting the performance of gum ties. In view of the rapidity with which gum decays unless the seasoning is carefully controlled, the study included a review of the practices of the roads with respect to the removal of the ties from the woods, the limitation of the cutting period, and the method and period of seasoning. Without exception, all of the roads using gum ties insist that they shall be brought out of the woods as soon as they are made, and stacked in open piles at station concentration yards for inspection. It was pointed out that the reason for this requirement is that gum is particularly susceptible to decay and that the conditions in the woods in which gum is native are unusually favorable for infection by decay-producing organisms.

Equal insistence is placed on early inspection and shipment to the treating plants where the ties can be placed in sanitary seasoning yards and kept under constant observation. Special attention was called by several officers to the desirability of making these shipments in open-top or stock cars, particularly in warm weather, since sap decay is likely to get a start in the short period required between the inspection yard and

the treating plant if closed cars are used. For the same reason, the ties must be unloaded promptly upon arrival at the seasoning yard.

In view of this extreme susceptibility of gum to infection and decay, most roads do not accept ties of this wood that are cut from early spring to late fall, although two roads, the Santa Fe and the Frisco, both of which use a great many gum ties, accept them when made during any month of the year. Even among those roads that restrict the cutting period, however, there is little consistency in the limitation placed on this period. As an example one road restricts the cutting period to August 15 to December 31; another, from September 1 to April 1; still another, from November 1 to February 15; while a fourth accepts only ties cut during the months from November to February, inclusive; with other dates intermediate to those cited. Again one road specifies that the ties must be cut only during the late fall and early spring months, and another "when the sap is in the ground."

#### Sap Decay Starts Quickly

Experience has shown that it is necessary to provide for free circulation of air around gum ties during the seasoning period. Otherwise, sap decay starts almost immediately and, once started, is completely out of control, so that the timber becomes a dead loss. For this reason, the method of stacking during the seasoning period by those roads using gum ties became a subject of inquiry. It was found that among these roads it is the invariable practice to stack gum ties in open piles, using either the alternate 2 and 7 piling or the 1 and 9 method, the latter being known generally as the German method.

Those who have been most successfully in the use of gum ties attach fully as much importance to the duration of the seasoning period as to the precautions to be observed in production, shipment and stacking for seasoning. Substantially all of these officers emphasized the danger that attends overseasoning. Without exception, on the roads in question, the ties are watched carefully and are treated as soon as seasoning has progressed to the point where satisfactory penetration can be obtained.

In general, the period of seasoning for gum ties is shorter than for other hardwoods, ranging from 4 to 10 months, depending on weather and temperature conditions. Thus, the Santa Fe is able to season gum ties in from 4 to 6 months at its treating plant at Somerville, Tex., but requires from 6 to 8 months at Wellington, Kan. The Missouri Pacific finds that an average of 4 months is sufficient, while the Rock Island requires from 7 to 10 months.

Several officers qualified their statements, however, by saying that the duration of the seasoning period depends so much on humidity and temperature conditions that there might be relatively wide variations from the figures given. As an illustration, Mr. Craft made this comment: "The amount of air seasoning that can be given depends largely on weather conditions. So long as the weather continues dry, gum ties will air season satisfactorily. On the other hand, a succession of wet and dry spells during the summer induces rapid and destructive infection."

Experience has shown that creosote is the most effective preservative for gum ties, but that to get best results it is necessary to secure the maximum penetration that can be obtained. A few of the roads under discussion are using straight creosote, but the majority use either a creosote-petroleum or a creosote-coal tar mixture, the proportions of which vary from 70-30 to

50-50. Substantially all of the roads were compelled to resort to zinc chloride about 1915, owing to the shortage of creosote occasioned by the war. As a result of this experience, the officers of these roads are in complete agreement that gum ties treated with zinc chloride have a much shorter life than those treated with creosote.

In the light of the information obtained from the roads whose practices have been discussed, it seems fitting to analyse the reasons why such widely differing opinions are held by maintenance officers with respect to the suitability of gum as a material for crossties. The facts presented by the selected roads, supplemented by information from many other sources, makes it clearly evident that not a few roads, in fact substantially all, that have attempted to use gum for ties, have had unfortunate experiences.

Information from these sources leads to the conclusion that some of those who now strongly condemn gum have assumed that the trouble they experienced is inherent in the wood and have let it go at that, without seeking either to confirm this conclusion or prove its falsity. Others have sought to discover the source of the trouble, but failing to throw some of the safeguards around the production, handling and seasoning of the



These Gum Ties, After 24 Years, Are Still Good For Many More Years of Service

ties, which are now known to be necessary, have also concluded that gum is not a satisfactory material for crossties.

Those who have persisted in their efforts, however, have learned that, while all species of gum are particularly sensitive to infection and, once infected, decay rapidly, most gums make good ties and some make excellent ties. They have also learned that gum ties cannot be expected to give satisfactory service unless certain definite precautions are taken during every stage of their manufacture, from the time the tree is cut until the ties emerge from the treating cylinder.

These precautions differ not in kind, but rather in degree, from those that should be observed in the production of ties from any other wood. In other words, the opportunity for infection should be minimized, the ties should be seasoned as rapidly as practicable, and the preservative should penetrate as deeply as possible. It should not be overlooked, however, that there is a wide difference between the statement of these seemingly simple principles and carrying them out.

#### When Should They Be Cut?

So far as the quality of the wood itself is concerned, it apparently makes little difference whether the ties are cut "when the sap is up" in the summer or when it is "down" in the winter. On the other hand, the op-

portunities for infection, always pronounced in the forests and climate in which gum is native, are greater in summer than in winter. Against this, winter is the rainy season, when it is difficult to handle the ties expeditiously, so that there may be delay in getting them out of the woods.

Prompt removal from the woods is important, however, to avoid infection, since it is difficult and usually impossible to arrest the progress of decay, once it gets a foothold. Experience has shown that the germination of the fungous spores can be checked to a reasonable degree by keeping the surface of the wood dry and allowing the air to circulate freely around it. This is the primary reason for the emphatic requirement that gum ties be stacked in open piles. Conversely, close piling, which prevents free circulation and retards the evaporation of surface moisture, provides most favorable conditions for the germination of the spores and growth of the fungi. In fact, so rapid is this growth under close piling that experienced maintenance officers insist on open-top or stock cars for shipping the still untreated ties to the seasoning yard, regardless of the time involved.

Red oak and some other woods check badly and even split if they are seasoned too rapidly. In some cases even the use of S-irons is not sufficient to overcome this tendency where the seasoning occurs rapidly. In contrast, the gums have closely knit fibres and the wood is unwedgeable, for which reason they can be seasoned as rapidly as conditions permit, without danger of checking. Aside from this lack of damage by checking, there is a marked advantage in this characteristic of gum, for there are no S-irons to interfere with trimming the ends of the ties as they pass through the adzing and boring machines, thus making it possible to inspect the ends for possible decay before treatment.

Overseasoning in gum may be as serious as failure to observe proper precautions during the seasoning period. In any event, prolongation of the seasoning period beyond the point of properly conditioning the ties adds to the danger of decay. For these reasons, roads using gum ties generally make it a point to have the ties watched carefully while seasoning by some one experienced in the handling of gum to insure that they will be treated as soon as they have become properly conditioned.

In all species of gum the sapwood takes treatment well, but the heartwood resists penetration of the preservative, more definitely in some species than in others, the sweet gums generally being the most refractory. In consequence, most roads endeavor to obtain ties with as much sapwood as practicable, particularly if they are of red gum. In fact, some roads will not accept red gum ties unless the heartwood is completely boxed or surrounded with sapwood.

The difficulty of getting satisfactory penetration of the heartwood by the preservative has been one of the factors that have given gum ties a bad name in some quarters. Emphasis has been placed on the necessity for closing every avenue to infection if the use of gum ties is to be successful. Observation over many years, as well as the testimony of maintenance officers of many roads, has shown that the great majority of gum ties fail from interior decay.

#### How Heartwood Becomes Infected

Before it was customary to prebore ties, an easy avenue for the entrance of decay-producing organisms was provided by the spoke hole, which penetrated the zone of treatment. To a large extent this means of entrance has been closed by preboring, with its resultant zone of treatment around the spike hole. There is

ample room for still further improvement in the handling of the ties by the maintenance forces, however, by eliminating the use of picks and shovels to pull them into the track and of striking them with mauls and sledges to space them or shift them endwise into position under the rail. Elimination of these abuses will increase the average life of any class of ties, but particularly of gum ties, since the life of gum ties may be measured by months, once decay gets a foothold.

Information at hand indicates clearly that no form of treatment or type of preservative can salvage a gum tie or insure a satisfactory service life if decay has been allowed to get a foothold. Assuming, however, that seasoning has been completed and the tie is sound, the preservative and method of treatment become paramount. It has been shown from the testimony of the officers who collaborated in this study, that zinc chloride is not a satisfactory preservative for gum. There is no evidence from this source or others that any preservative except creosote has been used widely enough to warrant conclusions as to its effect on the service life of gum ties.

In the early days of tie treatment, such gum ties as were treated with creosote were treated by the full-cell process. Later, this was generally superseded by the empty-cell process, the retention being about 5 lb. per cu. ft. of wood. Still later, creosote-petroleum and creosote-coal tar mixtures came into favor and are now used more widely than straight creosote. The range of the proportions of these mixtures has already been given.

As has been emphasized, the depth of penetration of the preservative is an important factor in "extending" the life of gum ties. With respect to the use of preservative mixtures, Mr. Harris illustrated the general attitude of those who have adopted them, in his comment that "from 1924 to the present we have been treating with a 50-50 mixture of creosote-petroleum residuum, and an 8-lb. retention, applied by the Rueping (empty-cell) process. This treatment was adopted to add to the quantity and percentage of the petroleum per cubic foot of wood, thus increasing the volume (the former practice was a 7-lb. treatment with a 70-30 mixture) of the preservative mixture retained, and the depth and uniformity of the penetration. We have found this treatment beneficial with respect to the retardation of surface checking and weathering, while the cost is about the same as a 5-lb. treatment with straight creosote."

#### Summary

In brief, it would appear from the survey that (1) difficulties have been encountered in the use of gum ties; (2) these difficulties can be overcome by simple precautions to protect the ties from infection; (3) these precautions do not differ, except in degree, from those which should be taken with other ties; (4) gum ties should be treated with either straight creosote or a mixture of creosote with either petroleum or coal tar; (5) where these precautions have been taken, gum ties rate equal or better than southern pine and red oak as to ultimate life, and superior to either of these woods in holding gage, freedom from splitting and resistance to wear.

THE KEYSTONE QUARTET, of the Pennsylvania Railroad, made up of employees of the accounting and car service departments of the road, at Philadelphia, has in the six months ending June 30 last sung before 94 audiences, totaling 42,375 people, in 44 cities scattered throughout the East, the South and the central West. A statement issued from the general offices of the road says that these men have during this period kept fully up with their regular work.

## Forestalling Moves of "Other Fellow"

# A NECESSITY IN PRICE COMPETITION\*

By F. J. Lisman

**Since reductions will be made anyhow, why not make them before trucks, barges get the business? Passenger department has shown the way to freight traffic revival**

FROM the angle of actual operations, railroad officers of the United States have always, on the whole, done a good job. This is not merely an assertion or tradition but can be proven by comparison with costs in other countries. This job is not 100 per cent efficient, but nothing in human affairs can achieve this. Its percentage of efficiency, as far as it is capable of analysis, will compare with industrial, mercantile and particularly governmental operations.

### Roads Excel at Competing with Each Other

From the angle of merchandising, that is, of selling their services, American railroads have not done a good job. This statement can also be proven by comparison with results attained in other countries; for example, in Great Britain. Conditions are never quite alike in any two countries and governmental interference in Great Britain is infinitely less than in America, while governmental co-operation is infinitely greater. Our railroad officers and traffic solicitors were brought up in an era when transportation was substantially a monopoly of the rail carriers. During this period they concentrated on competing with each other quite effectively, and, as time went on, more and more wastefully. One company after another introduced some wasteful practice in the hope of getting more competitive tonnage. Such practices were promptly met by the others until finally all companies were competitively on a parity, both from the point of view of giving shippers substantially the same facilities and their security holders a lesser return on account of wasteful expenditures of capital or for operating expenses.

The huge expenditures for warehouses, elevators, etc., are a fair example of capital waste, and free switching service to large industries and the permission to reroute cars in transit at a substantial cost to themselves but at no cost to the shippers, etc., are evidences of operating wastes.

### Successful Business Anticipates the "Other Fellow"

Officers up to about 1928 so concentrated on inter-railroad competition that they failed to visualize that other methods of transportation were likely to cut more

and more rapidly into their imaginary monopoly. A manufacturer or purveyor of most other services tries to figure out what his competitor is going to do, and then endeavors to beat him to it—whether it be by way of changing the method of service, reduction in price, or both. Railroad officers, instead of anticipating the moves of the other fellow and studying his steadily decreasing costs and future possibilities, have made nearly every concession in price and service protestingly and reluctantly and most always too late. Practically every one in contact with transportation knows of examples of this, but it might be just as well, in order to prove this allegation, to recite a few of them. There is the interesting case of the manufacturer of glass linings of tanks for breweries who had to do some thinking when prohibition went into effect and annihilated his market. He bethought himself of the desirability of glass linings for the conveyance of milk and endeavored to interest the railroads in thus transporting this commodity. His ideas met with no encouragement either by way of trial or adequate rates. Thereupon he took this matter up with some builders and operators of trucks who did respond and who, in consequence of showing a little more vision, are now handling a large proportion of the milk traffic. The railroads are now willing to make rates equal to probably one-half those which, if they had made them at the inception of the idea, would have held the business, but it has left them for good.

### Loss of Gasoline Traffic

There is the case of gasoline rates from the Port of Mobile, where there is water competition, to the Birmingham district. In 1931, the traffic manager of an important oil company informed the interested railroads that the marketing division of his company was contemplating moving gasoline by barges to points in Central Alabama. The rate from Mobile to Birmingham at that time was 30½ cents per hundred pounds. The official of the oil company stated that if he could get a 25 cent rate, the railroads would hold the business. They did not do it. In consequence, substantially all the major oil companies in this section are now handling gasoline in barges, and the subsequent reduction of the railroad rate to 15½ cents per hundred pounds has not been able to fetch the business back to the rails. Examples of this kind could be multiplied ad infinitum.

Over one-half the Florida citrus fruit traffic has already left the rails, which accounts in part for the financial plight of the carriers serving that state. At present the Florida citrus fruit producers want the rail rates to middle western points reduced to a level competitive with suggested truck and water rates, in order to enable them to continue their customary methods of shipping this particular traffic by rail. The Federal Barge Line has proposed the construction of refrigerated barges; refrigerated trucks are multiplying. Thus far the rail carriers have declined the request of the shippers for lower rates, while their competitors are proposing to grant them provided they are assured of an adequate

\* The *Railway Age* takes pleasure in presenting this article by this stimulating analyst, but with the belief that there is much to be said on the "other side" in some of the situations he criticizes.—EDITOR

volume of traffic to justify the necessary capital investment.

The I.C.C. could not reasonably refuse to authorize such lower rates by competing carriers if they could make a showing that such rates would pay all their operating costs plus depreciation and a fair return on the investment. Of course, it has not the power to prevent lower rates in the case of water lines and intra-state motor carriers. Fully one-half of the strawberry crop of the extreme South during the 1936 season was moved by truck at a loss of probably fully \$500,000 in gross revenue by the railroads, because some of the large carriers declined to face the disagreeable reality that it was necessary to reduce both minimum carload requirements and rates as well.

Too frequently traffic managers haggle with the shippers, giving them a reduction which does not hold or regain competitive business but merely reduces the revenue on tonnage still tied to the rails. Obviously it would be silly to reduce rates according to shippers' demands only; such action must be based on a thorough study of competitive costs and their potentialities. The average traffic man is probably no more qualified to make such analyses than would be a salesman of Fall River cotton textiles to comprehend and forecast the cost accounts of a Japanese textile mill. Yet the competitors' costs are the measure of the job before him. Is there any department in the average railroad organization qualified for making such analyses? If not, why not get to it now—it should have been done ten years ago.

Lest the writer be accused of condemning by the clear cold light of hindsight, there follows a quotation from an article in the *Railway Age* of January 2, 1920:

Automobile roads must take the place of most branch lines and the sparsely settled states will have to enact legislation to aid in railroad construction, which will be more or less along the lines of drainage and irrigation development.

And from an article in the *Railway Age* of December 8, 1928:

The railroads are in excellent position to compete with trucks if they will face the situation and promptly modernize their plants, getting the maximum result at the least cost out of the combination of long haul by rail plus short haul service by truck. They thus will be able to utilize their facilities to the fullest advantage. The motor truck business is still in its infancy.

Undoubtedly the railways can make a strong showing that present rates do not pay a fair return on their physical valuation. However, if others can handle the business more cheaply, a low rate of return merely proves that some of the capital invested in the railroads must be written off permanently. The market place for railroad securities has already done this by adjusting security prices accordingly. The law of the "survival of the fittest" is at work all the time in every walk of life and protesting against it is a loss of time and energy, of benefit only to some members of the legal profession.

#### Railroads Should Fight to Establish Train Load Rates

Tens of thousands of miles of pipe lines have been constructed during the last 15 years to carry crude oil or gasoline which the railroads could have carried as cheaply and without additional capital investment if they had been allowed to make train load rates. Because the I.C.C. years ago did not permit train load rates, little or no effort whatever has been made to show the unreasonableness of this ruling under changed conditions. Nor have train load rates been mentioned in connection with Fourth Section relief on transcontinental traffic!

Undoubtedly some man of vision, who can see the industry as a whole instead of looking at it from the narrow compartment of any one company, would long ago have visualized and put into effect, as far as any one

man or company could, a universal container, closer co-ordination between the rail and highway carriers, etc. Surely it was obvious to thousands of others in 1927, as it was to the writer at that time, that the highway carriers were going to bring about a great change in transportation which would require co-ordination, change in the methods of hauling I.C.C. traffic, the development of containers, etc. Some not only saw it but acted upon it and profited thereby, as is evidenced by the various carloading and car owning corporations and others who embarked in this line of business and are now thoroughly rooted in the transportation field, making a profit which the carriers should have reaped themselves by being more forehanded and aggressive.

There are few cases of mature, well-known railroad executives who have been offered employment in other walks of life during the last decade, but the writer is not able to recall a single case of a traffic or merchandising man trained in other industry being hired by a railroad. A suggestion that new blood be introduced from time to time would probably meet with the usual objection: "Our situation is different—he would not understand it." Quite likely no field of endeavor can show as few interchanges of personalities with other walks of life as railroad transportation.

There has been much criticism on the alleged waste of the cost of the Co-ordinator's office but it certainly must be admitted that the Co-ordinator has done things which have stimulated thinking, which has accelerated many savings. The president of the A.A.R. in one of his recent speeches stated that the frozen per diem plan was saving the railroads about 10 million dollars per year and that the theoretical savings of upwards of 50 million dollars per year suggested by the Co-ordinator's organization were impossible. Frozen per diem in its present form probably cannot last. Among other difficulties with it, the western lines are quite likely to find that their box cars suitable for grain traffic are being considerably abused in hauling coarse commodities while on frozen time out of Western territory. But, anyway, it may be doubted that we would even have frozen per diem if it had not been for the Co-ordinator. The admitted one year's saving from this plan alone exceeds five times the entire assessment levied on the railroads to pay for the full period of the Co-ordinator's office.

#### Vested Interests which Oppose Co-ordination

Every unprejudiced person will admit that great savings by the co-ordination of terminals are possible, but obviously within every railroad organization there are vested interests which could scarcely be expected to become enthusiastic for unification of terminals. Whether there be three terminal supervisory staffs in a comparatively small center or twenty in a large city, it is obvious that co-ordination will cause heads of one or more of these staffs to lose their jobs or be demoted. Inasmuch as nobody is sure just who is going to hold his job in a unification, everyone works against unification and finds reasons why it cannot be done. It is not to be expected of human nature that it should be otherwise. Nor should supervisory officers be blamed too seriously if they write the kind of reports which they think the boss wants. Too often the boss is intolerant of any but "yes" men. It is difficult to ascribe any reason, other than this natural one of self-protection, for the opposition to a "clearing house" for interline accounts, recommended by the Co-ordinator. Certainly the opposition to co-ordination cannot arise from a purely unselfish concern for the good of the railroad industry as a whole.

In addition to narrow self-interest as an obstacle to

joint economies, there is also that which arises from sheer inertia. "After a lifetime of active work with big corporations," E. St. Elmo Lewis, an expert in merchandising, says, "it requires a good deal of effort to get an organization to do things differently from what it is accustomed, because it is so easy for the routinist to amble along in the same old rut. He resents with all the fervor of a narrow soul anything in the way of an innovation—and if you want to see fervor expressed in white heat of vicious criticism and vicious reprisal, you want to see a bureaucrat or a routinist at work on an innovation." (Quoted from "The Wedge" published by Batten, Barton, Durstine & Osborn, Inc.)

How far have the railroads gone toward co-ordination with highway carriers? They are still endeavoring to compete on l.c.l. short haul business and are bitterly resenting the activity of trucks in trying to handle profitable long haul business. Would it not be good sense for the railroads to withdraw from business on which they cannot make any money by asking permission from the I.C.C. to give up l.c.l. traffic completely within certain limits, say on heavy commodities up to 20 miles and on lighter commodities up to 100 miles? Sometimes it is contended that the short haul l.c.l. business would help to pay out-of-pocket expenses. This again recalls the story about the old lady who said she lost money on every pair of stockings she knitted but she made it up on the quantity.

#### **Nothing Sacred About a Rate Structure if it Doesn't Move the Business**

Authority on the recent application to the I.C.C. by the B. & O. and Chicago Great Western for permission to put in rates to haul trailers between large cities was slow in being granted, owing to opposition by other carriers on the theory that such action will seriously interfere with the rate structure. There should be nothing sacred in a rate structure which fails to produce results. As Clyde Brown of the New York Central once said, in effect, in a brief, the rate structure which embodies the genius of so many rate experts of times past may also perpetuate their mistakes. If any carrier can earn 20 cents gross per car-mile both ways and if the expenses involved in loading and unloading are nominal, it is pretty good business. Refusing to make these rates is not going to stop the trucks from handling it if they can make a reasonable profit. If the trucks should be prohibited from taking away the profitable long haul business of the railroads because it might cost them more to haul it over the highway than it does the rail carriers, then the shippers, whether they be manufacturers or distributors can and will do their own hauling if they can do it at a cost lower than the prescribed rates, whether by truck or rail. Anyone traveling on the highways who reads the nationally known names on passing trucks must become convinced of this.

Large truck operators are offering some regular trailer traffic to the railroads because, presumably, taking all costs and hazards into consideration, the railroads can handle these trailers at possibly one cent per truck-mile cheaper than it would cost to operate over the highways. This brings up the question—Why should not the railroads themselves pick up and deliver much l.c.l. and possibly other tonnage and handle it in trailers or interchangeable containers instead of again letting others make a profit which the carriers by being foreminded should secure for their own corporations; and for their security holders who have been deprived of a fair return on their investment by shortsighted management, technical regulating bodies, and largely ignorant vote-chasing legislators?

It is probable that the trucks and buses are not con-

tributing their full share of constructing and maintaining highways plus their fair share of the general tax burden. That, however, is something which thus far has not been sufficiently analyzed and furthermore, if true, will tend to right itself in time. But it is not a condition the correction of which the railroads can expect to restore much traffic to them in the immediate future. The recent plaint published in "Transportation Topics" (the mouthpiece of the truckers) that the trucks with 13 per cent of the vehicles are paying 25 per cent of all highway taxes is the opposite from convincing, because if, instead of dealing with a ratio of trucks to total vehicles, the tax load were allocated to gross ton-miles on the highway, even irrespective of the hammer blow of the wheels of heavy vehicles, it would probably develop that the trucks and buses are hauling loaded and empty fully two-thirds of the ton-miles over the highways while paying but one-quarter of their proportion of highway costs.

#### **Immediate Losses the Price of Future Profits**

Undoubtedly the I.C.C. and the states themselves with their great needs for additional revenue will gradually come around to realize this, but in the meanwhile complaining about highway carriers is not getting the traffic back on the rails. Railroad rates, as is generally recognized, have been constructed to a considerable extent on what the traffic will bear. They are now being too slowly adjusted to competitive conditions, and mostly by the light of hindsight instead of by the light of foresight. If foresight were to be used promptly, it would be necessary to reduce many rates and do many things which, for the time being, might even reduce revenue but in the long run would stop further depletion of reasonably profitable tonnage. It would mean that much of the traffic would be taken off the highways by putting trailers and containers on railroad cars, by facilitating business through interchangeable containers and thus expanding markets for many commodities. To put it differently, lower freight rates, rail as well as other, reduced cost of packing and prompter delivery in better condition should cause traffic to expand.

The Co-ordinator's staff may not have been right in estimating 100 millions possible savings on l.c.l. traffic; but, anyway, they have already stimulated savings of several million dollars by arousing the interest of the carriers in the many opportunities which exist for concentrated or increased loadings. The weekly reports of carloadings show a steady decline in the percentage of l.c.l. cars loaded during approximately four years, from about 28 per cent of the weekly total to about 23 per cent. Some of this may be due to the competitors getting the business, but undoubtedly some is due to better average loadings. The preventable waste in the handling of this type of traffic is still tremendous. It still requires about 23 per cent of all carloadings to handle the l.c.l. tonnage, which aggregates about  $2\frac{1}{2}$  per cent of the total.

After losing about 80 per cent of their passenger revenue, the railroads have at last gotten busy first by reducing rates and then by improving service. They can do the same, with vastly greater results on net earnings, by showing a similar reawakening in dealing with their freight business. It has been generally recognized for a long time that the passenger rate of 3.6 cents per mile was prohibitive and subject to the law of diminishing returns. The recent compulsory reduction to 2 cents per mile in the East was a serious experiment, the result of which it is too early to foretell, although from preliminary reports, it appears to be a decided success in many directions. However, the Pullman rates of 3 cents per mile are probably too high compared with

the coach rates. For instance, an additional cost of about \$3 per passenger between New York and Boston and New York and Washington for the privilege of riding in a car not appreciably more comfortable than a day coach, which is frequently much better lighted, is excessive. The western lines have found that 2 cent rates all around produce more revenue.

#### Passenger Department Has Shown the Way for Freight Traffic Revival

The loss of traffic to the buses and the further potential loss to the airplanes has awakened the passenger organization sufficiently to cause them to give accelerated and improved service which is really getting the business, not only in part from buses and in part from airplanes, but to a considerable extent from the private automobile; and is also stimulating travel which would not have been undertaken but for the low rates. This success has encouraged passenger men who are now on their toes and eager to make all kinds of innovations and experiments. If the freight traffic organizations will follow this example, they will probably also succeed, and that will be followed by the working out of the rule that "Nothing succeeds like success."

Transportation is no longer a monopoly. The public has realized it; the regulating bodies and the railway managements have realized it in theory only, but have not adjusted their activities accordingly. Some railway managements appear to believe that because the motor trucks are now to be regulated that their rate structure will be protected—losing sight of the fact that private carriers on highways can probably not be regulated at all and, even if this could be done, such laws on account of their unpopularity could not be passed unless the government were operating the railroads. In that event, of course, competitors would be ruthlessly extinguished as has been done in Germany and other Continental countries.

By the light of the Co-ordinator's studies, the cost of yards and other expenses in connection with the assembling of large trains may exceed their economies. Rail carriers must aim, in order to compete with the airplane service and in order to discourage the use of private automobiles, to make thousand-mile runs between important cities practically over night and to come close to transporting people from the Atlantic to the Pacific in not much more than one day and two nights—by making the coast-to-coast run on schedules similar to those now provided between Chicago and Denver and Chicago and the Twin Cities. Freight trains carrying other than coarse commodities likewise must be operated on still faster schedules and the distribution of I.C.C. freight should probably be done largely through trailers and containers.

#### Success of Motor Regulation Not Yet Certain

In spite of the public appeal of the expensive Diesel-drawn trains, it will not be possible to call them a success until much more is known about their operating and depreciation costs over a long period. The bulk of the engineering fraternity connected with the railroad profession still believe that the beloved old steam engine can be operated substantially as fast and more economically than any other motive power. The problem of speedy train operation does not consist so much in running fast as in stopping fast. The brake people have made much progress and will undoubtedly accomplish more. The roadbeds and appurtenances are gradually being adjusted to the changing conditions.

It is now nearly one year since the I.C.C. acquired authority over interstate highway carriers, but very little

progress has been made in regulating their status. Probably it was too big an order. It will take fully five years before this regulation will be at all effective, quite irrespective of the fact that the control of water lines and intrastate highway carriers is not included. The government subsidized Federal Barge Line is still with us. In 1935 it carried about 70,000 tons of freight over the much advertised Missouri River Improvement between St. Louis and Kansas City. The upkeep of this improvement alone, irrespective of the cost of operation, interest, etc., amounted to \$10 per ton of freight, or over four times what it would have cost to ship this tonnage by railroad.

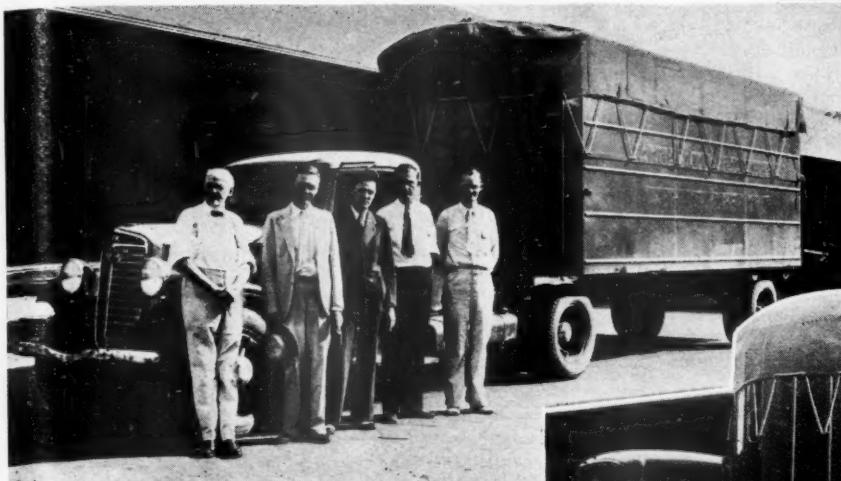
The apparently unsatisfactory prospect of lower average railroad rates can in time be turned into a greater net profit by increased volume and the elimination of needless large and small wastes. After all railroad profit always has been, and always will remain, in quantity production of transportation. The Chesapeake & Ohio and Norfolk & Western railways with the lowest ton-mile rate and probably the largest proportion of empty car mileage, are still the most profitable carriers in the country. Part of successful merchandising in any line of business is to try to push the paying lines to the utmost and to try to drop all unprofitable lines; this applies to lines of merchandise as well as to lines of railroads.

#### A Clearer Picture of the Transportation Situation

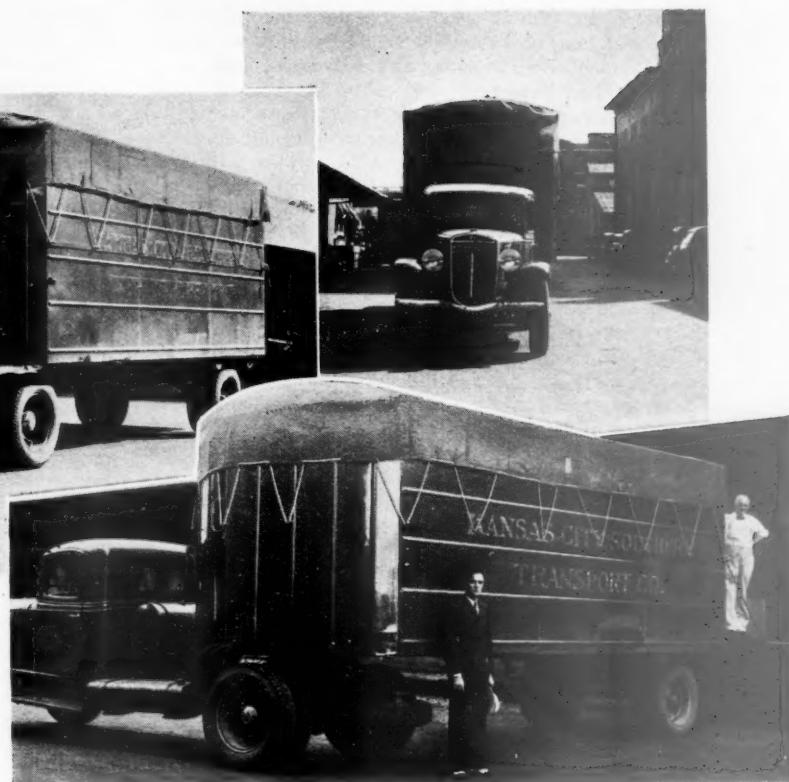
At present the future of transportation is clarifying. This clarification is based on the facts which are daily becoming more obvious among which are:

1. No one method of transportation has a natural monopoly.
2. The short hauls of freight and passengers will be by highway.
3. The long haul of freight and passengers must be speeded up more and more and the plant and equipment adjusted accordingly, in order to keep other carriers from too extensive an invasion of a field in which, naturally, the railroads should be pre-eminent.
4. Every effort must be directed toward a maximum revenue of dollars per passenger train- and per freight train-mile, irrespective of individual rates, but with due regard to all types of operating costs. (Nothing is gained by operating heavier trains if the savings are dissipated in heavier terminal costs).
5. Wherever possible, railway and highway transportation must be "co-ordinated" ("co-ordination" in this sense meaning maximizing the ease of interchange of traffic between rail and highway) in order to improve service to the public and reduce the expenses of the carriers and shippers.
6. In order to reduce railway operating expenses, consolidation of terminals and shops must be accelerated, and such work as accounting and the handling of money, combined and many types of facilities and business pooled; parallel trackage abandoned and joint usage substituted; substantially all branch lines earning less than \$2,000 per mile gross abandoned and highway service substituted therefor.
7. Education of the public, and particularly the shippers, so they will see the monetary advantage to themselves and will thus co-operate in all these efforts instead of favoring economies in theory, but narrowly-mindedly opposing them by all possible means when they are to be put into effect in their own case, like the would-be Socialist who was anxious to participate in the division of the property of everybody else but was himself unwilling to do any dividing.
8. Education of the I.C.C. and state commissions to realize that they are not dealing any longer with a

(Continued on page 216)



Railway-Owned Trucks Such as These Are Widely Used in Inter-City and Collection and Delivery Service



# Speed and Efficiency in Handling Merchandise

Superintendents' Association considers all phases of efficient movement of I. c. l. traffic

## Part II

THE report of the committee on merchandise handling, presented before the American Association of Railroad Superintendents in Chicago on June 17, the first portion of which was published in the *Railway Age* of August 1, continues as follows:

Pick up and delivery service has increased enormously during the past year and in every case where statistics are available it has been found that it has resulted in increased merchandise traffic. There are certain phases of the situation, however, which should be noted. This service of course should be given as wide a publicity as the fast merchandise service. The Pennsylvania, for instance, by means of a widespread advertising campaign and by the efforts of its officers and employees in acquainting the public with its pick up and delivery plan, has been quite successful in the past few years in regaining merchandise traffic.

From an operating standpoint, however, close supervision of pick up and delivery service is extremely important, for, with so many outside factors involved, such a service may well become disorganized under improper supervision, particularly at large terminals, and cause a great deal of dissatisfaction among the shippers. In this connection particular reference is made to the elaborate, but not particularly expensive, dispatching system that has been worked out by the Pacific Motor Transport Company, a wholly-owned trucking subsidiary of the Southern Pacific. In all the large centers, as well as in the smaller ones where this factor is important, the Pacific Motor Transport Com-

pany has worked out a definite schedule of regular routes to serve regular shippers. The incoming calls for pick up service from occasional shippers are handled in a central bureau which dispatches the trucks on these irregular runs but which, through experience, knows the approximate time necessary for such runs, with all due consideration to traffic conditions at various times



Trucks of This C. St. P. M. & O. Subsidiary Operate in All Sorts of Weather Conditions

of the day and other factors, and so schedules the trucks that a minimum of lost time is involved. Similar set-ups are recommended at all points where pick up and delivery service is engaged in to any great extent.

Advice has been received to the effect that the providing of pick up and delivery service at certain stations and not at others, has a vitiating effect on the plan as a whole. This is brought about by the fact that the shippers have a certain transportation set-up, either by truck or by railway, providing for all stations, and where such shippers are using the highways exclusively it is found that they object to breaking up this plan of handling traffic in order to give the railways part of the business where pick up and delivery service is available and leave the rest for the trucks. In other words, these shippers maintain that it is inefficient for them to handle their business through certain large towns by truck to reach the small towns where collection and delivery service is not provided when they might just as well load their freight for the larger towns, through which the trucks have to pass in any event, and thus cut out the railways entirely.

Two questions have arisen in connection with the provision of pick up and delivery service. One of these questions deals with the relative merits of contracting for pick up and delivery service with many draymen in one place or using one drayman exclusively. There seem to be arguments on both sides although the consensus of opinion is that with many contracts the cartage companies involved use their contacts and thus provide an important solicitation body.

Two other questions have to do with the five cents per hundred allowance for delivery or pick up by the shippers themselves. Certain roads have found this to be desirable—others advance the following objections:

Only shippers located adjacent to freight stations avail themselves of the option.

With the consequent loss of short haul traffic, the cartage companies may demand higher rates for the balance.

Such allowance may lead to requests for additional stations in competitive areas.

Without the option and with complete pick up and delivery service, it is possible to close some of the stations in larger terminals by making arrangements for direct handling by the cartage companies to and from the main station.

### Simplification

In Canada and on certain intrastate business, classification and packing requirements have been simplified. The pick up and delivery tariff in Canada provides:

"Articles must be in such condition and so prepared for shipment as to render their transportation reasonably safe and practical. Each package must show the name and complete address of the consignee."

An experiment has been made in the rate structure on such shipments whereby a one-class rate, approximately equivalent to the former third class rate, with free pick up and delivery, has been successful in regaining traffic that was lost to the trucks.

Several traffic and operating officers in this country have recommended that the rigid rate structure now prevailing, which takes cognizance only of carload and less-than-carload differentials, should be changed to a differential scale providing for separate and lower rates on shipments between 4,000 and 16,000 lb. on a sliding scale. This has been adopted by truck companies and has proved very successful in obtaining business.

Two interesting experiments along these lines are being tried by the Canadian roads, whereby, in one territory, a shipper may ship 1,000 lb. or more, and in another 5,000 lb. or more at an all-commodity rate that is less than the all-commodity 1. c. 1. rate for shipments of lesser weight.

An interesting step forward along the lines of simplification has been the establishment by the Texas & Pacific of "grocery mixture" rates, intrastate in Texas, which apply one average rate on all the thousands of items included in grocery shipments. Such shipments were formerly a nightmare to bill clerks and auditors, usually requiring enormous waybills showing many items at various rates. The huge amount of paper work involved was a fruitful source of overcharge claims, and the entire proceeding was such a nuisance to the shipper that grocery shipments had largely gone over to highway competitors. Under the present system, however, the checker simply checks in so many pieces of "grocery mixture," regardless of whether these

pieces are brooms or soap boxes. The waybill is prepared in the same simple fashion.

This innovation has proved popular with the grocery jobbers, and grocery shipments now represent an important item in T. & P. traffic and revenues. The system has been in effect for 18 months and not only are claim payments on grocery shipments less than they were formerly, but claims on this commodity are less than on most other commodities.

The provision of practically universal pick up and delivery service also brings up the question as to whether the free time now allowed on less-than-carload freight in freight houses may not safely be reduced from four days to the former basis of two days, with resultant economies.

### Rail-Highway Co-ordination

The co-ordination of rail and highway service on merchandise traffic, it may safely be said, has made greater strides in the last 18 months than in any similar or even longer period since such operations were begun. Of particular interest is the operation of the Southern Pacific subsidiary, the Pacific Motor Transport Company, which, by undertaking a wide variety of services and taking advantage of the greater flexibility of the truck in collecting merchandise traffic from the smaller towns and concentrating it at the central point of origin and more particularly in picking up traffic at a rail head distribution point and delivering it to the smaller towns, has been successful in bringing the merchandise traffic of this railroad to a point above the 1929 level.

Other rail-highway subsidiaries throughout the country have had similar experiences, the New Haven Transportation Company being another outstanding example. In Montana, the Great Northern and the Northern Pacific have established an elaborate rail-highway co-ordination along their respective lines which has been successful despite the handicaps of the mountainous country traversed. In the southeast the Seaboard Air Line has evolved a number of truck lines which not only provide a more flexible service but also avoid many local stops that would otherwise have to be made by through trains. Several of the Texas lines have intercity truck lines that are functioning quite successfully.

Another interesting example of what may be done in the rail-highway co-ordination is the plan of the Missouri Pacific in Kansas, Missouri and Nebraska where, in addition to a large mileage of intercity truck lines along the railway, a number of cross country truck lines are operated between stations on parallel-branch lines of the Missouri Pacific, which serve only cities and towns on the Missouri Pacific, but by operating cross country between the branches and the main line avoid long delays in getting the traffic by rail off the branch lines which in many cases follow a circuitous route and involve handling through two or more terminals before reaching the main line.

Several of the railroads also have purchased large independent trucking companies and plans are now under way in a number of instances to co-ordinate the services of these trucking companies with the rail service so that by sending shipments part way by rail and part way by highway the most efficient and economical transportation may be provided for the shipper, with the inevitable resulting increase in merchandise traffic. Several of the railways which have been most successful in operations of this sort hold joint conferences between traffic and operating officers periodically to determine the advisability of truck operation in certain places and after these recommendations have been made by the district officers they are sent to the general officers for final approval. Such studies are made for the purpose of developing whether the inauguration of truck services to supplement the rail services would result in economy or improvement in service or both.

Such services were formerly handled very largely through contracts but the prevailing trend now seems to be towards actual railroad operation and ownership of the trucks. As one railroad expresses it: "Originally the contracts for handling this work were rather generally made with local trucking firms, but it developed that this was not satisfactory, and it was found preferable, particularly at the smaller stations, to have some member of our own organization handle this particular feature of the work, with the result that wherever possible we have entered into contracts with our agent or some member of the station force to handle pick up and delivery business. This gives us representatives who are personally interested in our af-

fairs, personal and direct contact with shippers and receivers of freight, and as above stated, has resulted not only in an increase in our l.c.l. business, but also, in some decrease in claim payments, and particularly has resulted in better satisfied customers."

### Conclusions

Service plays a large part in controlling merchandise traffic but basically and finally the controlling feature is cost. Improved service, of course, such as studying the needs of the shipper and delivering or picking up his freight at places and times where he wants it picked up or delivered, have a cost relationship, but rates have a more direct and psychological bearing on the minds of the shippers than anything else. It is not within the province of this committee to make recommendations to the traffic departments of the railways as to what rates shall be charged on less-than-carload traffic since this is a feature that has been studied very thoroughly by the traffic departments over a long period of years. It is, however, within the province of operating officers to reduce costs by a thorough study of the methods now being employed in handling less-than-carload freight and the possibility for improving them to produce greater efficiency.

The committee suggests that present accounting arrangements seem cumbersome and costly and that simplification would reduce costs and permit a lowering of rates, not merely as an expedient dictated by competition but actually on a sound economical basis as the result of a reduction in costs. The theory that still persists in some circles that the procuring of merchandise traffic is not worth while is largely based upon the idea that the present handling, billing and accounting of merchandise traffic are so complicated and so surrounded by restrictions as to be uneconomical. Even under present conditions it is the opinion of this committee that merchandise traffic can be made a valuable adjunct of railway traffic and produce its quota of total revenues.

increase of 15.6 per cent, while merchandise showed an increase of only .4 per cent.

Loading for the week ended July 25 totaled 731,062 cars, a new peak for the year and an increase of 135,490 cars, or 22.7 per cent, above the corresponding week of 1935 and an increase of 10,660 cars, or 1.5 per cent, over the figures for the week before. Grain and grain products and coke showed decreases as compared with the week before but all commodity classifications showed increases over last year. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading			
For Week Ended Saturday, July 25			
Districts	1936	1935	1934
Eastern	152,781	129,458	130,513
Allegheny	147,996	116,841	113,255
Pocahontas	49,785	43,433	42,861
Southern	95,124	79,228	80,348
Northwestern	121,183	88,912	95,701
Central Western	108,952	89,822	97,302
Southwestern	55,241	47,878	50,062
Total Western Districts	285,376	226,612	243,065
Total All Roads	731,062	595,572	610,042
Commodities			
Grain and Grain Products	55,022	33,357	43,627
Live Stock	13,648	9,672	26,295
Coal	112,946	102,916	101,670
Coke	8,612	4,560	4,528
Forest Products	34,700	28,682	21,713
Ore	55,174	34,700	30,803
Merchandise L.C.L.	162,337	154,978	158,514
Miscellaneous	288,623	226,707	222,892
July 25	731,062	595,572	610,042
July 18	720,402	592,672	616,040
July 11	724,324	565,502	604,192
July 4	649,759	471,126	520,741
June 27	713,639	616,863	646,003
Cumulative Total, 30 Weeks	19,416,417	17,385,601	17,787,638

## Freight Car Loading

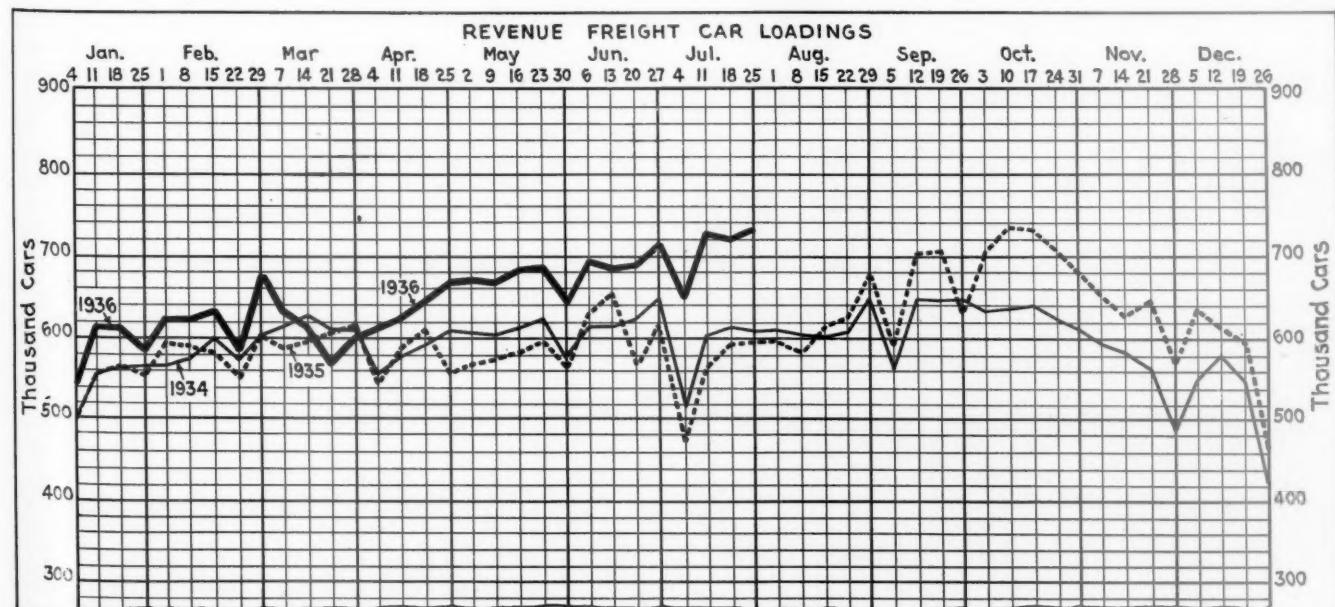
WASHINGTON, D. C.

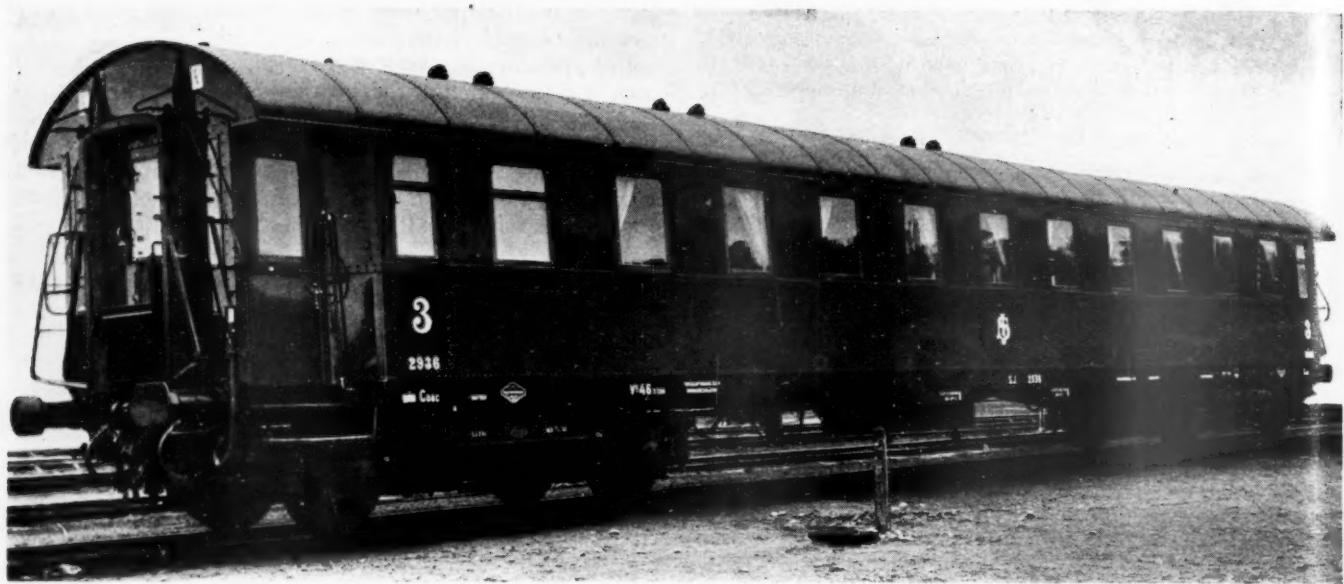
REVENUE freight car loading in the first 30 weeks of this year, January 1 to July 25, was greater than that for any corresponding period since 1931, according to a statement issued by J. J. Pelley, president of the Association of American Railroads. The total was 19,416,417 cars, an increase of 2,030,816 cars, or 11.7 per cent, as compared with the total for the corresponding period of 1935, but a decrease of 2,628,000 cars, or 11.9 per cent, as compared with the corresponding period in 1931. Miscellaneous freight showed an

### Car Loading in Canada

In Canada, in the week ended July 25, car loadings totaled 44,706, as compared with 45,496 in the preceding week and 43,342 a year ago, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
July 25, 1936	44,706	21,984
July 18, 1936	45,496	21,280
July 11, 1936	47,912	21,251
July 27, 1935	43,342	18,458
Cumulative Totals for Canada:		
July 25, 1936	1,307,112	698,466
July 27, 1935	1,288,124	654,002
July 28, 1934	1,268,632	679,497





A Swedish Car of 1933 with New Twelve-Foot Wheelbase Trucks, Longitudinal Bolster Springs and Triple Spring Suspension

# Riding Qualities of Passenger Cars

Knowledge of harmonic vibrations essential for correct design—Why European roads are discontinuing American type trucks

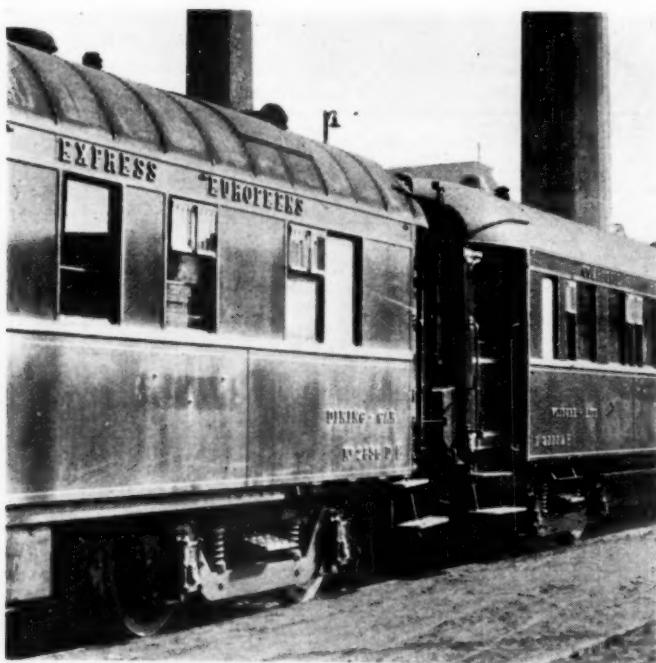
By A. Giesl-Gieslingen

**O**BSERVATION as well as comments from the traveling public show unmistakably that, broadly speaking, we are now confronted with a serious problem in matching the riding comfort of our cars with the rapid advances in speed and streamlining, air con-

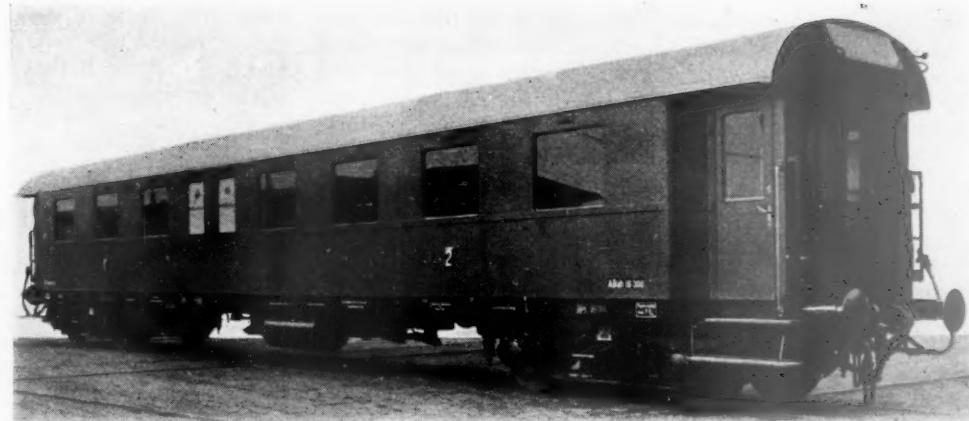
ditioning and interior decoration. This is particularly true of cars mounted on four-wheel trucks.

The most common inconveniences are sustained vibrations (rattling), vertical oscillations with a frequency of between 2.5 and 3, often induced by rail joints and, last but not least, jerky side motions even on straight track which often make it impossible to walk through the aisle without bracing oneself against the seats. We cannot dispose of these conditions by blaming the permanent way because one can observe them on track which is so reasonably good that insisting on higher standards of maintenance would be too costly. It is the duty of the truck and the body suspension to convert any sudden jerk to which a wheel may be subjected into a body motion which will not be annoying. There is no reason why this should not be possible, as long as we limit the initial disturbances received by a wheel to amplitudes of  $\frac{1}{2}$ -in. to  $\frac{3}{4}$ -in. which values need not be exceeded on "good" track. The broad question is, however, whether the present offenses are due to accidental defects of design or whether the standard American four-wheel equalizer truck and body suspension is inherently unsuited to respond to the requirements of today.

For the comfort of those who operate such trucks in large numbers, it can be said that greatly improved riding is often obtainable by simple changes in details only. This appears to be proved by recent trains such as the Mercury of the New York Central. For instance, let us take the following actual observations: A certain passenger car, when striking a poor rail joint, made three to five quite distinct vertical oscillations with a natural frequency of 2.5 per second. When the speed reached 56 m.p.h. on 33-ft. rails, resonance was established and even on the best track there were continuous oscillations.



American Type Passenger Trucks Under Modern Cars of the International Sleeping Car Co., Paris, In Use Since Shortly After the War



A 1930 Austrian Car with Older Type of Central European Truck, Having Crosswise Bolster Springs, but Triple Spring Suspension

Now the curious thing was that, standing up and making so simple an experiment as holding a pencil with the outstretched arm against a paper on the wall, one could see that the amplitude of the car body was small, hardly more than  $\frac{1}{8}$ -in., making a total vertical movement of  $\frac{1}{4}$ -in.; but sitting down one appeared to jump on one's seat by more than one inch in a most annoying manner. Another simple test cleared up the reason for that. If one let oneself drop on the seat cushion, the resulting oscillations induced by the cushion springs were of the same frequency of 2.5 per sec. as those of the car body. Thus, the resonance with the rail joints made the car body oscillate with moderate amplitude, but the seat cushion, instead of performing its function of providing comfort, established resonance with the average passenger's body mass and acted as an amplifier.

This is a typical example of conditions which can easily be eliminated without any basic change in truck design. In designing a new car, such detrimental effects can be avoided by properly co-ordinating the timing of all possible harmonic oscillations, and the burning of a moderate amount of midnight oil will pay large dividends. We have now reached a development in railroading where the theory of vibrations can no longer be disregarded in favor of cut-and-try methods. The latter are too costly.

The question of what constitutes an uncomfortable vertical motion has been widely covered by recent Ger-

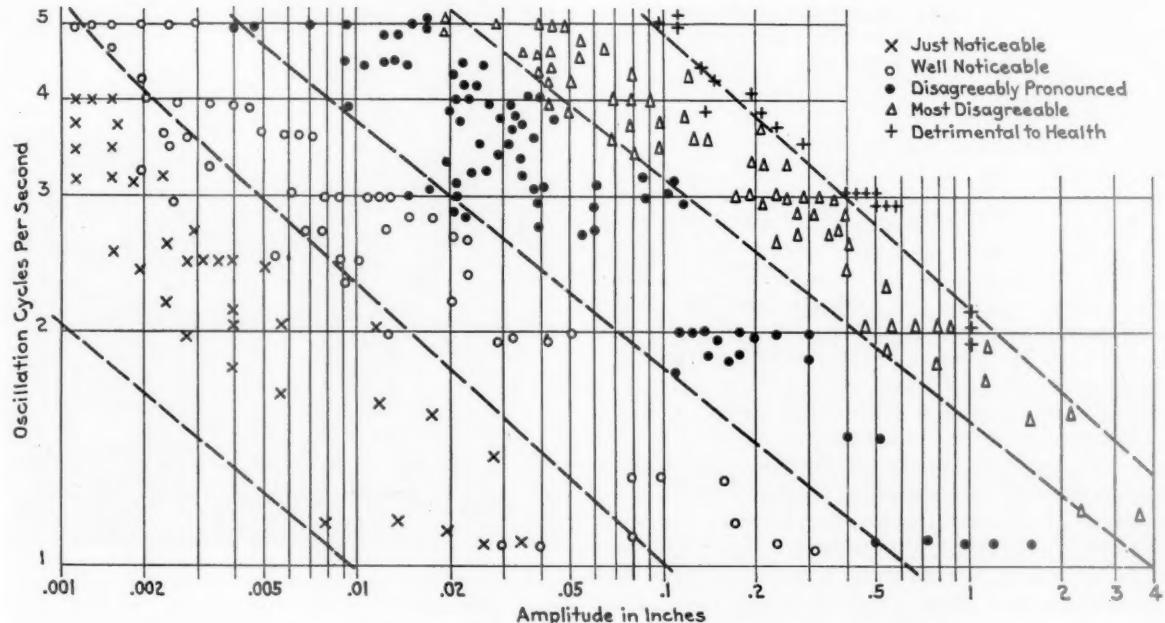
man tests,\* the results of which are reproduced in part. The chart is self-explanatory and very useful for design purposes.

The maximum lateral acceleration above which one cannot hold one's balance unaided while walking through a car aisle has, so far as the author knows, not been scientifically determined, but from a simple home-made test he would conclude that one-tenth of gravity constitutes the limit. Then we have to place the centers of our feet about 20-in. apart laterally while walking. An unavoidable lateral force of 0.1 gravity will also be exerted if curves having a superelevation of 5 in. are negotiated at a speed of

$$\frac{125}{\sqrt{\text{degrees}}} \text{ m.p.h.}$$

(that is, 72 m.p.h. for a three-deg. curve) which may constitute a suitable practical limit, somewhat above usual regulations but often reached in service. Lateral is used here to mean parallel to the car floor. If the car leans outward to any appreciable extent under the influence of the centrifugal force, then this lateral component may be considerably increased, which should of course be avoided. From these considerations we may conclude that the car-body suspension should be able to compensate any side movement of the wheels in such a way that a lateral force of well below 0.1 gravity is

\* Zeitschrift des Vereins deutscher Ingenieure, February, 1936.



Physiological Effect of Vertical Oscillations According to Reiher and Meister

exerted on the car body. In contrast to this we can observe side jerks of 0.15 and 0.2 gravity on modern equipment, and no wonder the passenger complains that he has difficulty in walking to the dining car, which has been redecorated and air-conditioned for his comfort.

The conventional bolster suspension links are provided to permit relative lateral motion between truck and car body and to control lateral forces. For softer action of these links, the British Gresley compound bolster has come into use on a few recent high-speed trains in this country. It is reasonable to expect, however, that we should start cushioning the lateral shocks where they originate, namely, by providing controlled lateral motion between axle and truck frame.

Interesting light is cast upon the question of spring selection by the fact that the disagreeable vertical oscillations of the car previously mentioned were caused almost exclusively by the action of the helical equalizer springs. The laminated bolster springs practically failed to participate, or else the natural frequency would have been much lower. Now, the combination of laminated and helical springs in series is ordinarily credited with the advantage of providing effective damping by the internal friction of the former. But if that friction is so high that the helical springs may set up disturbing oscillations without bringing the other spring into play, then there is no damping effect. The frictional resistance in a semi-elliptic spring may be calculated as follows:

$$R = P \frac{2t}{l} (n-1) u$$

where  $R$  ..... resistance in lb.  
 $P$  ..... load upon spring in lb.  
 $t$  ..... thickness of leaves in in.  
 $l$  ..... length between end suspensions in in.  
 $u$  ..... coefficient of friction between adjoining leaves = 0.28 for perfectly greased springs to 0.6 for dry springs (leaves not ground in either case).

For conventional bolster springs we shall find that

$$R = \frac{u}{8} \text{ and since the springs are likely to be dry in average service, a vertical force of } 7\frac{1}{2} \text{ per cent of the car-body weight may act before these springs come into play at all. This causes discomfort. Moon* concludes that the friction of laminated springs is valuable only if it does not exceed about } 3\frac{1}{2} \text{ per cent. It can be reduced to that amount without resorting to expensive measures, by making the springs long, with correspondingly thicker leaves. This has been done extensively in Europe. Then, the springs cannot be put crosswise under the bolster as in the usual American design but they have to be located lengthwise, which leads us away from the conventional four-wheel equalizer truck now standard in this country. The lengthwise bolster spring, 80-in. long and over, on a Swedish car exhibited in Brussels in 1935, which is shown in one of the photographs, is of German origin. Incidentally, it transmits the load to the truck frame near to the axles and consequently permits the use of a long wheel-base of 12 ft., which is so essential to smooth riding, without the excessive weight which a lengthened standard truck would require. These bolster springs can also be given a wide crosswise spacing. These short notes will have served their purpose if they help to open discussion of the vital subject of truck design. Much can be done to improve existing trucks; but the whole problem should be thrown open without adherence to what are not standard forms. For instance, the American equalizer truck gained wide favor in Europe twenty years ago, even on the old State Railways of Prussia, because it proved to be superior to what was then the practice over there. But in recent years, after$$

exhaustive tests, it has been replaced by the design installed under the Swedish car here illustrated. This is another indication that we should not be satisfied with what we have.

## A Necessity in Price Competition

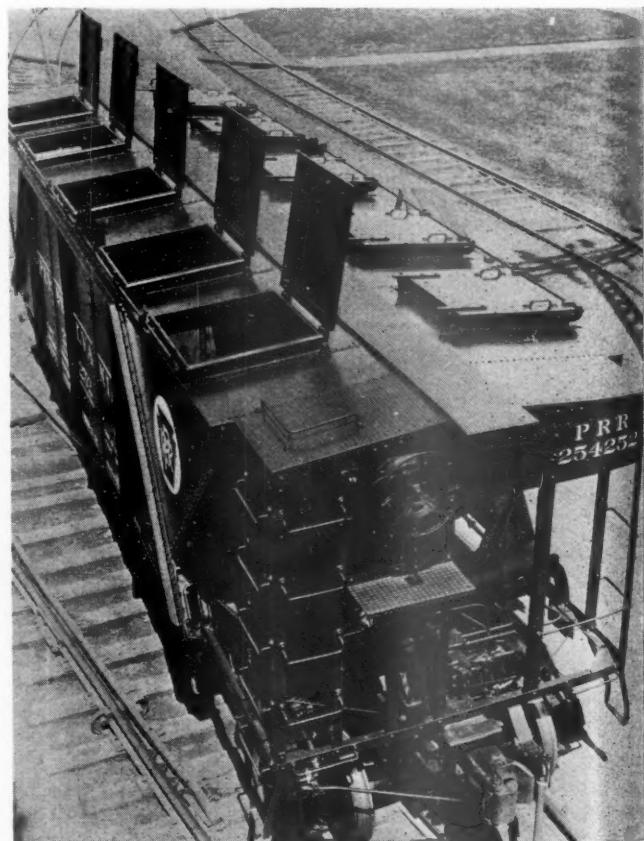
(Continued from page 210)

monopoly, and thus to change their mental attitude so they will not always construe any doubtful question against the carriers. (Obviously if the railroad security holders have to suffer from obsolescence, it is no injustice for individuals who have invested capital along obsolete branch lines also to lose).

It takes courage to be a realist. Those who are courageous and will face the facts, however unpleasant they may at first appear, and act upon them will reap large rewards, just as did those who rebuilt the outstanding railroad wrecks of the 1890's as, for example, the Norfolk & Western, Union Pacific and Santa Fe.

Where there is no vision the people perish! There appears to be no vision in Congress in connection with transportation matters. Unless such vision can be injected into our legislators by railroad management and by enlightened public opinion, complete government ownership with complete loss of money invested in railroad stocks and most of the money invested in railroad bonds is inevitable. But clarity and reality in facing facts, tough-minded analysis of them—and then vigorous action—by management is the first essential. Quite likely it is the *only* essential.

\* \* \*



One of 400 Covered Hopper Cars for Cement Service Equipped with Alan Wood Super-Diamond Pattern Rolled Steel Plate Walkways and Brake Steps. In This Particular Construction the Lateral and Longitudinal Walkways Are Part of the Roof

# I.C.C. Reports on Passes

Comprehensive statistical summary given by Bureau  
of Statistics without conclusions

WASHINGTON, D. C.

CLASS I railroads in the first quarter of 1936 issued 3,074,586 passes, of which 2,218,261 were term and 856,325 were trip passes, for use during the year, according to a report of the Bureau of Statistics of the Interstate Commerce Commission of an inquiry undertaken for the purpose of obtaining a comprehensive statistical summary of the extent to which free transportation is accorded to various classes of persons to which the railroads are authorized to issue passes by the provisions of the interstate commerce act and in order to bring about greater uniformity in the records in which such statistics are kept.

Approximately 96 per cent of the total number of passes were issued to railroad officers and employees and members of their families, the report shows, and the Pennsylvania, which issued the largest aggregate number, issued 1.04 per \$1,000 of operating revenues, 84 per cent of them to its own employees.

Because the reports submitted covered only the first quarter of the year, no attempt was made to draw any general conclusions as to the relative generosity of the various railroads in the matter of free transportation and it was pointed out that it was not possible to determine accurately the amount of free transportation handled by the railroads from the number of passes issued because some railroad officers receive a considerable number of term passes, some of which are never used, although some are used very frequently. The Passenger Traffic Report issued in 1935 by Co-ordinator Eastman's Section of Transportation Service had included an estimate that the passenger transportation furnished gratis was equivalent to at least \$50,000,000, but the bureau's report makes no attempt to give any such estimate.

For the twelve roads which issued the largest aggregate number of passes the total number issued per 1,000 revenue passengers carried in 1935 (excluding commutation) ranged from 8 to 67.

Attention is called to the fact that in considering the total number of free passes issued and requested, or the ratio of term to total passes, it should be kept in mind that the term passes reported for the first quarter probably represent approximately 90 to 95 per cent of the total to be issued for the whole year but that the trip passes reported for the first quarter may be less than 25 per cent of the total to be issued for the year since the first three months are not the most desirable time for vacation traveling.

Of the 3,074,586 passes issued, 2,070,827 were issued to employees of the reporting carrier and their dependents and 871,267 were issued to employees of other carriers and their dependents.

The purpose of the inquiry is explained in a quotation from the annual report of the commission to Congress for 1935 as follows:

"Under Section 1 (7) of the Interstate Commerce Act carriers subject to the provisions thereof, in certain cases are permitted to issue or give free tickets, free passes, or free transportation, as well as to the interchange same with other carriers subject to certain provisions contained in the statute. In order to secure greater uniformity in the various classes into which carriers now are keeping statistics of the number of passes issued an inquiry is in progress to determine the extent to which carriers

are issuing passes and free tickets. Certain records are kept by carriers in accordance with our regulations governing the forms and recording of passes, but a comprehensive statistical summary of the extent to which free transportation is accorded to various classes of persons heretofore has not been attempted."

On November 13, 1935, the commission issued an order requiring the Class I steam railways and the Pullman Company to report quarterly the free transportation issued and requested for use during 1936 (but not thereafter unless further ordered) according to a schedule form supplied the roads. The order was not served on switching and terminal companies because very few of them operate any passenger service and issue any passes.

In response to the inquiry of the commission, 117 reports, representing 140 Class I railways, and reports from the Pullman Company and the state of New Jersey respectively were submitted and tabulated. Because some of the reports were filed on a system basis, they also covered 26 Class II roads, 7 Class III roads, and 2 switching and terminal companies. The returns by certain of the roads in the United States controlled by Canadian carriers (Canadian National Lines in New England, Grand Trunk Western Railroad Company, Canadian Pacific Lines in Vermont, International Railway Company of Maine) were not tabulated because they were not comparable with the other reports submitted. All the passes good over all the Canadian lines in Canada and certain major divisions were also good over the controlled lines in the United States mentioned above. Consequently, the reports of these carriers include all passes good over them irrespective of whether the holder is employed on the road in question or on the lines in Canada.

Following is an abstract of the report, which summarizes several accompanying statistical tables:

## Analysis of Returns to Commission Inquiry

The total number of passes issued prior to April 1, 1936 for use during the year ended December 31, 1936 was 3,074,586, of which 2,218,261 were term and 856,325 trip passes. They were divided among the following groups:

Class of recipient	Number of passes issued			
	All kinds	Per cent of total issued	Term	Trip
Carrier officers, employees and their families	2,942,094	95.7	2,131,744	810,350
Livestock caretakers and others provided for in published tariffs	22,431	.7	54	22,377
Contractors engaged in work for respondent railways	14,164	.5	8,879	5,285
Government officials*	15,501	.5	15,070	431
Eleemosynaries, clergy, educators, etc.	24,779	.8	16,365	8,414
Directors, local counsel and surgeons, and all others	55,617	1.8	46,149	9,468
Total	3,074,586	100.0	2,218,261	856,325

\* Employees of Federal, State, and municipal governments.

The number of passes issued by Class I roads as a group to employees of other Class I roads (455,930 term and 234,051 trip passes) exceeds the number requested (329,307 term and 225,668 trip passes). This excess, which represents passes issued without request, is 28 per cent of the term and 4 per cent of the trip passes issued.

The total number of passes issued by Class I railways, mentioned above, includes 917 term passes issued by the state of New Jersey to certain public officials in accordance with Chapter

120, Laws of 1934 of the state of New Jersey. These passes are good within the borders of the state on all the railways operated within it. New Jersey is the only state which issues passes direct instead of requesting them from the railways.

The Pullman Company issued 23,178 passes, of which 15,366 were term and 7,812 trip passes. These passes granted the holders free use of various types of Pullman facilities such as rooms, berths, and seats.

**1. Total number of passes issued to all persons per \$1,000 of railway operating revenues**

The ratios for the twelve roads which issued the largest aggregate number of passes are as follows:

Railway	Aggregate	Total number of passes issued revenues for year 1935	Per \$1,000 operating
Pennsylvania	383,226	1.04	
New York Central System	262,922	.77	
Atchison, Topeka & Santa Fe System	137,362	1.01	
Baltimore & Ohio	126,602	.88	
Missouri Pacific Lines	91,409	.95	
Louisville & Nashville	90,104	1.19	
Southern Pacific (Pacific Lines)	88,210	.69	
Chicago, Rock Island & Pacific†	86,686	1.29	
Chicago, Burlington & Quincy	86,022	1.04	
Illinois Central System	84,978	.86	
Chicago & North Western‡	73,233	.79	
Chesapeake & Ohio	70,923	.62	

\* Includes Staten Island Rapid Transit.

† Includes Chicago, Rock Island & Gulf.

‡ Includes Chicago, St. Paul, Minneapolis & Omaha.

Among all the roads which operate passenger trains, the ratio ranges from 0.26 passes per \$1,000 railway operating revenues for the Atlanta, Birmingham and Coast Railroad Company to 3.97 for the Burlington-Rock Island Railroad Company. About two-thirds of the passenger carrying railways have averages ranging between 0.6 and 1.4 passes per \$1,000 of railway operating revenues, as shown in the following table:

Total number of passes issued to all persons per \$1,000 of railway operating revenues for year 1935	Number of railways in each class
0.2—0.5	11
0.6—0.9	36
1.0—1.3	27
1.4—1.7	11
1.8—2.1	5
2.2—2.5	5
2.6—2.9	2
3.0 and over	3
Total	100*

\* For purposes of this tabulation the 17 railways which reported issuance of passes but do not operate passenger trains are excluded.

**2. Total number of passes issued to all persons per 1,000 revenue passengers carried**

The total number of passes issued to all persons per 1,000 revenue passengers carried (excluding commutation) has been suggested as a measure for comparison instead of the ratio of nonrevenue to revenue passenger miles (which is not available). However, it should be kept in mind that the number of passes issued is an imperfect measure of the use made of those passes.

Roads which have a relatively low ratio of passenger to total railway operating revenues generally issue a larger number of passes per 1,000 revenue passengers carried than roads with a relatively high ratio of passenger to total traffic. This relationship, however, is modified by such factors as the policy of the various carriers and the usefulness of transportation over their lines. For the twelve roads which issued the largest aggregate number of passes, the averages are as follows:

Railway	Total number of passes issued to all persons per 1,000 revenue passengers carried in year 1935 (excluding commutation)	Per cent of total railway operating revenue for year 1935
Southern Pacific (Pacific Lines)	8	14
Illinois Central System	9	9
Pennsylvania	13	16
Chicago & North Western	16	11
Baltimore & Ohio	17	7
New York Central System	19	16
Louisville & Nashville	23	8
Chicago, Burlington & Quincy	27	8
Missouri Pacific Lines	42	6
Chicago, Rock Island & Pacific	52	9
Atchison, Topeka & Santa Fe System	61	10
Chesapeake & Ohio	67	3

The number of passes per 1,000 revenue passengers for all Class I roads operating passenger trains varies from 1 for the Long Island Railroad Company, which has a very high ratio of passenger to total railway operating revenues, to 734 for the Wheeling and Lake Erie Railroad Company, which has a very low ratio. More than half of such roads issued less than 40

passes per 1,000 revenue passengers as shown in the following table:

Total number of passes issued to all persons per 1,000 revenue passengers in year 1935 (excl. commutation)	Number of railways in each class
0—19	24
20—39	27
40—59	16
60—79	10
80—99	9
100—119	3
120—139	3
140—159	1
160—179	3
180—199	4
200 and over	100
Total	100

**3. Total number of passes issued to all persons per employee of issuing carrier**

A comparison between the total number of passes issued to all persons and the number of employees of the issuing carriers is probably the best relative measure of the generosity of the various railroads in issuing passes when allowance is made for variation in the ratio of term to total passes.

Ninety-six per cent (96%) of all the passes issued before April 1, 1936, for use in 1936 were given to the employees and their dependents of either the respondent railroad or of other carriers. One of the factors determining the number of passes issued to other carriers seems to be the number of passes received from those carriers (which is affected by the number of employees of the respondent railroad).

For the twelve roads which issued the largest aggregate number of passes, the averages are as follows:

Railway	Total number of passes issued to all persons per employee of issuing carrier for year 1935
Chicago & North Western	2.4
Southern Pacific (Pacific Lines)	2.4
New York Central System	2.7
Illinois Central System	2.9
Chesapeake & Ohio	3.0
Missouri Pacific Lines	3.1
Atchison, Topeka & Santa Fe System	3.5
Baltimore & Ohio	3.5
Chicago, Burlington & Quincy	3.5
Pennsylvania	3.6
Louisville & Nashville	3.8
Chicago, Rock Island & Pacific	4.0

For all railways operating passenger trains the total passes issued to all persons per employee vary from 0.5 for the Atlanta, Birmingham and Coast Railroad Company to 13.8 for the Burlington-Rock Island Railroad Company. Sixty per cent (60%) of such roads issued between 2.0 and 4.0 passes to all persons per employee as shown in the following table:

Total number of passes issued to all persons per employee of the issuing carrier for year 1935	Number of railways in each class
0.0—0.9	2
1.0—1.9	4
2.0—2.9	29
3.0—3.9	31
4.0—4.9	17
5.0—5.9	5
6.0—6.9	4
7.0—7.9	2
8.0—8.9	3
9.0 and over	3
Total	100

**4. Ratio of number of term to total passes issued to all persons**

As previously explained, the term passes reported probably represent approximately 90 to 95 per cent of the total to be given for the whole year, while the trip passes may be less than 25 per cent of the annual total. For the twelve roads which issued the largest aggregate number of passes, the ratios are as follows:

Railway	Ratio of number of term to total passes issued to all persons (per cent)
Louisville & Nashville	52
Southern Pacific (Pacific Lines)	54
Chicago, Burlington & Quincy	60
Missouri Pacific Lines	63
Chicago & North Western	63
Atchison, Topeka & Santa Fe System	64
Illinois Central System	64
Pennsylvania	73
New York Central System	74
Baltimore & Ohio	75
Chicago, Rock Island & Pacific	79
Chesapeake & Ohio	81

For all roads operating passenger trains, the percentages of term passes to total passes issued to all persons vary from zero for the Atlanta, Birmingham and Coast Railroad Company and the Georgia Railroad to 100 per cent for the Lehigh and Hudson River Railway and the Lehigh and New England Railroad Company.

More than half of all such roads had figures between 70 and 90 per cent as shown in the following table:

Ratio of number of term passes to total passes issued to all persons (per cent)	Number of railways in each class
0—9	3
10—39	2
40—49	4
50—59	17
60—69	26
70—79	28
80—89	18
90—99	2
100	100
Total	100

5. *Ratio of number of passes issued to carriers' own employees and their dependents to total passes issued to all persons*

Sixty-seven per cent (67%) of all passes issued by respondent railways to all persons were given to their own employees and their dependents. For the twelve roads which issued the largest aggregate number of passes, the ratios are as follows:

Railway	Number of passes given by respondent to its employees and dependents, per 100 of the total passes issued to all persons
Pennsylvania	84
Chesapeake & Ohio	77
New York Central System	77
Atchison, Topeka & Santa Fe System	75
Louisville & Nashville	75
Baltimore & Ohio	74
Southern Pacific (Pacific Lines)	72
Illinois Central System	70
Missouri Pacific Lines	68
Chicago, Burlington & Quincy	67
Chicago & North Western	65
Chicago, Rock Island & Pacific	65

The ratios for all roads operating passenger trains vary from 16 employee passes per 100 passes issued to all persons for the Burlington-Rock Island Railroad Company to 86 for the Bessemer & Lake Erie Railroad Company. The individual road percentages may be classified as follows:

Number of passes given by respondent to its employees and dependents, per 100 of the total passes issued to all persons	Number of railways in each class
10—19	1
20—29	5
30—39	15
40—49	17
50—59	20
60—69	22
70—79	16
80—89	4
Total	100

6. *Number of term passes issued to employees and their dependents per employee*

It should be remembered that employee passes are issued not only to employees included in the wage statistics furnished the commission but also to superannuated, pensioned, furloughed, and retired employees and their dependents, and the dependents of deceased employees. Furthermore, as previously explained, the term passes reported probably represent approximately 90 to 95 percent of the total to be given for the whole year, while the trip passes may be less than 25 per cent of the annual total.

For the twelve roads which issued the largest aggregate number of passes, the ratios are as follows:

Railway	Number of term passes issued by respondent to its employees and their dependents per employee
Southern Pacific (Pacific Lines)	0.9
Chicago & North Western	1.0
Illinois Central System	1.3
Missouri Pacific Lines	1.3
Chicago, Burlington & Quincy	1.4
Louisville & Nashville	1.5
Atchison, Topeka & Santa Fe System	1.6
New York Central System	1.7
Chesapeake & Ohio	1.9
Baltimore & Ohio	2.0
Chicago, Rock Island & Pacific	2.2
Pennsylvania	2.3

The individual ratios for the roads operating passenger trains may be classified as follows:

Number of term passes issued by respondent to its employees and their dependents per employee	Number of railways in each class
0.0—0.3	3
0.4—0.7	6
0.8—1.1	17
1.2—1.5	32
1.6—1.9	22
2.0—2.3	12
2.4—2.7	5
2.8 and over	3
Total	100

7. *Ratio of number of term passes to total passes issued by respondent railways to their employees and their dependents*

This ratio also is affected as previously explained by the fact

that the number of term passes will nearly equal that for the entire year, while the number of trip passes for the first quarter will probably be less than 25 per cent of the year's total. However the ratios are interesting for comparative purposes.

For the twelve roads which issued the largest aggregate number of passes, the ratios are as follows:

Railway	Number of term passes per 100 of total passes issued by respondent to its employees and their dependents
Louisville & Nashville	52
Southern Pacific (Pacific Lines)	54
Chicago, Burlington & Quincy	60
Illinois Central System	64
Missouri Pacific Lines	64
Chicago & North Western	65
Atchison, Topeka & Santa Fe System	65
Pennsylvania	76
Baltimore & Ohio	76
New York Central System	81
Chesapeake & Ohio	81
Chicago, Rock Island & Pacific	85

The percentages for all roads operating passenger trains vary from zero for the Atlanta, Birmingham & Coast Railroad Company, Atlanta and West Point Railroad, and Georgia Railroad to 100 per cent for the Lehigh & New England Railroad Company and Lehigh Valley Railroad Company. More than half of such roads had figures between 80 and 99 per cent. The individual road percentages may be classified as follows:

Number of term passes per 100 of total passes issued by respondent to its employees and their dependents	Number of railways in each class
0—9	3
10—19	1
20—29	1
30—39	1
40—49	1
50—59	9
60—69	16
70—79	16
80—89	32
90—99	20
100	2
Total	100

8. *Ratio of number of passes issued to employees (and their dependents) of other Class I railroads, to passes requested from such carriers*

The number of passes issued by any road to employees of other roads seems to be influenced by the following factors:

- The activity of the issuing road in matters of free transportation;
- The relative number of passes received in exchange;
- The usefulness of transportation on the issuing road.

For the twelve roads which issued the largest aggregate number of passes, the ratios are as follows:

Railway	Number of passes issued to other Class I roads per 100 passes requested from such carriers*
Southern Pacific (Pacific Lines)	131
Louisville & Nashville	130
Chicago & North Western	128
Chicago, Burlington & Quincy	121
Chicago, Rock Island & Pacific	118
Pennsylvania	110
Baltimore & Ohio	109
Chesapeake & Ohio	100
New York Central System	97
Atchison, Topeka & Santa Fe System	87
Illinois Central System	82
Missouri Pacific Lines	73

\* Covers only passes issued and requested for employees and dependents of Class I steam railways other than switching and terminal companies.

For all roads operating passenger trains the passes issued to other Class I roads per 100 passes requested varies from 43 for the Chicago & Illinois Midland Railway Company to 1,337 for the Alabama Great Southern Railroad Company. Twenty-one per cent (21%) of such roads issued fewer passes than they requested, while the rest issued as many or more, as shown by the following table:

Number of passes issued to other Class I roads per 100 passes requested from such carriers*	Number of railways in each class
0—49	2
50—99	19
100—149	35
150—199	19
200—249	4
250—299	9
300—349	3
350—399	2
400—449	1
450—499	1
500 and over	5
Total	100

\* Covers only passes issued and requested for employees and dependents of Class I steam railways other than switching and terminal companies.

# NEWS

## Research Advancing Rail Transport, Says Wallace

Sees industry on threshold of one of most active and fruitful eras in its history

Research advancing rail transportation is proceeding on a vast scale, according to L. W. Wallace, director of the Division of Equipment Research of the Association of American Railroads, who declared in a recent statement that "the railroad industry stands on the threshold of one of the most active and fruitful eras of its history." Pointing out that the railroads are purchasers of more than 70,000 commodities, Mr. Wallace asserted that through the network of relationships built up around the transportation system of the United States a very large research personnel is working directly and indirectly in behalf of the railroad industry.

"These many relationships," he continued, "mean that of the hundreds of millions of dollars spent annually for research by such industries as the steel, chemical, electric, textile, railway supply, and others, a measurable amount is spent directly in response to the needs of the railroad industry. In the last analysis the railroad industry pays a measurable amount of the cost of such research as is devoted to developing the commodities it uses in the price it pays for such commodities.

"These facts are not generally known or are purposely disregarded by many who proclaim that the railroads are moribund. Evidently there is either a misunderstanding of the appropriate place of the railroad industry in the research pattern or lack of a rational conception of what constitutes research. Actually, there is a seething ferment of thought and action among railroad executives and scientists, engineers and other employees connected with the industry. They are eager to apply any new procedure which will enable the railroads to make available better transportation. Economy, efficiency, comfort, dependability, and safety are the aims sought.

Mr. Wallace points out that the Division of Equipment Research is now functioning as a co-ordinator of research effort. Better correlation and more definite integration, he reports, are being attained among the many agencies enlisted in railway advancement.

"The place of the railroad industry in the research pattern is essentially and necessarily applied research," Mr. Wallace explains. "This is also true of all others who purchase materials and equipment for

their individual use in the sense the railroads do. The sum spent by both the railroad and railway supply industries annually for research is very large and is undoubtedly as large as that of many other industries. Even such a total would not include a reasonable proportion of the creative research expenditures of that long and important list of industries which sell commodities to the railroad industry. The amount spent for creative research in the development of the vast number of commodities which the railroads buy and use must be rather staggering.

"The Division of Equipment Research realizes that it would be thoroughly impracticable and inadvisable to have a staff

## Six Months Railway Net a 2.22 Per Cent Return

\$238,243,934 compares with \$194,776,454 or 1.81 per cent in first half of 1935

Class I railroads for the first six months of 1936 had a net railway operating income of \$238,243,934, which was at the annual rate of return of 2.22 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics of the Association of American Railroads. In the first six months of 1935,

### CLASS I RAILROADS—UNITED STATES Month of June

	1936	1935	Per Cent of Increase
Total operating revenues.....	\$330,691,513	\$281,328,058	17.5
Total operating expenses.....	241,811,554	216,550,258	11.7
Taxes.....	26,842,213	20,451,395	31.2
Net railway operating income.....	50,312,580	34,102,703	47.5
Operating ratio—per cent.....	73.12	76.97	...
Rate of return on property investment—per cent.....	2.42	1.63	...

### Six Months Ended June 30

Total operating revenues.....	\$1,872,928,867	\$1,635,535,933	14.5
Total operating expenses.....	1,421,381,428	1,259,945,852	12.8
Taxes.....	148,668,143	121,312,664	22.5
Net railway operating income.....	238,243,934	194,776,454	22.3
Operating ratio—per cent.....	75.89	77.04	...
Rate of return on property investment—per cent.....	2.22	1.81	...

and laboratory facilities adequate in size and quality to deal with the great number of research problems which it will be expected to and must consider. The Division will therefore maintain a relatively small staff and will purchase only such special equipment as may be needed and not available in some laboratory. As each problem arises it will enlist the services of the best talent and facilities available for such research. Thus there will continue to be brought to bear upon the railroad research problems the highest degree of scientific and professional talent. Today two of the leading metallurgical research institutions are working on problems assigned to them. Three of the large technical institutions are likewise working on assigned problems. The research program on the air conditioning of railroad passenger cars recently authorized is being so organized that the best research facilities of manufacturers, railroads, and technical universities will be used.

Enumerating other research tasks of the railroads, Mr. Wallace describes the development of the locomotive, stressing the possibilities of the more recently constructed locomotive laboratories of the University of Illinois and the Pennsylvania Railroad.

their net railway operating income was \$194,776,454, or 1.81 per cent on their property investment.

Operating revenues for the first six months totaled \$1,872,928,867, compared with \$1,635,535,933 for the same period in 1935, an increase of 14.5 per cent. Operating expenses amounted to \$1,421,381,428, compared with \$1,259,945,852 for the same period in 1935, an increase of 12.8 per cent.

Class I railroads in the six months paid \$148,668,143 in taxes, compared with \$121,312,664 in the same period in 1935, or an increase of 22.5 per cent. For the month of June alone, the tax bill amounted to \$26,842,213, an increase of \$6,390,818 or 31.2 per cent above June, 1935.

Twenty-seven Class I railroads failed to earn expenses and taxes in the first six months of 1936, of which 9 were in the Eastern district, 4 in the Southern and 14 in the Western district.

Class I railroads for June had a net railway operating income of \$50,312,580, which, for that month, was at the rate of 2.42 per cent. In June, 1935, their net was \$34,102,703, or 1.63 per cent. Operating revenues for June amounted to \$330,691,513, compared with \$281,328,058 in June, 1935, an increase of 17.5 per cent. Operating expenses in June totaled \$241,811,554, compared with \$216,550,258 in the same

month in 1935, or an increase of 11.7 per cent.

Class I railroads in the Eastern district for six months had a net of \$161,543,115, at the rate of 2.94 per cent. For the same period in 1935, their net was \$143,065,483, or 2.60 per cent. Operating revenues in the Eastern district for six months totaled \$963,589,281, an increase of 12.7 per cent, compared with 1935 while operating expenses totaled \$697,121,937, an increase of 12 per cent. Railroads in the Eastern district for June had a net railway operating income of \$30,040,172, compared with \$27,706,923 in June, 1935.

Class I railroads in the Southern district for six months had a net of \$32,366,971, at the rate of 2.07 per cent. For the same period in 1935, their net amounted to \$24,425,031, at the rate of 1.55 per cent. Operating revenues in the Southern district for six months amounted to \$240,010,929, an increase of 12.9 per cent compared with the same period in 1935, while operating expenses totaled \$182,712,154, an increase of 9.1 per cent. Railroads in the Southern district for June had a net of \$4,683,953, compared with \$3,532,295 in June, 1935.

Class I railroads in the Western district for six months had a net of \$44,333,848, at the rate of 1.21 per cent. For the same six months in 1935, the railroads in the district had a net of \$27,285,940, at the rate of .74 per cent. Operating revenues in the Western district for six months amounted to \$669,328,657, an increase of 17.9 per cent above the same period in 1935, while operating expenses totaled \$541,547,337, an increase of 15.2 per cent. For June, the railroads in the Western district reported a net of \$15,588,455 compared with \$2,863,485 for the same roads in June, 1935.

The Bureau of Statistics of the Interstate Commerce Commission has adopted a plan of issuing advance summaries of the railroad reports of their operating revenues, expenses, taxes, rents, and net railway operating income. The first such advance summary was issued on July 29 covering reports for June and six months of the year. A second more complete summary was issued on July 30 and a final summary, 100 per cent complete, was issued on August 3, the same day that the compilation of the Bureau of Railway Economics was released. The commission's complete statement of the revenues and expense reports for June will not be issued until later in the month.

### I. C. C. to Investigate Hours of Service of Motor Carrier Employees

With a view to the establishment of reasonable requirements with respect to the maximum hours of service of employees of motor carriers in interstate or foreign commerce, as provided for in the motor carrier act, Division 5 of the Interstate Commerce Commission has ordered a proceeding of inquiry and investigation covering both common and contract carriers of passengers and freight which has been set for hearing at times and places yet to be announced. At the same time the commission ordered a similar proceeding for the purpose of determining whether, in the interest of, and to pro-

mote safety to, the general public, there is need for the prescription of qualifications and maximum hours of service and standards of equipment in connection with the operation of motor vehicles used in transporting property by private carriers.

### Western Lines Extend Limit for Return Trips

After October 1 passengers on western lines paying the low round trip fares will have 30 days in which to make the return trip. Since the western lines reduced their rates in December, 1933, round trip fares have been 1.8 cents a mile in coaches, with a 10-day return limit.

### McLaury to Direct A.A.R. Advertising

Herbert F. McLaury, advertising manager of the Chicago, Burlington & Quincy, has been selected to direct the advertising of the Association of American Railroads, with headquarters at Washington, D. C. Mr. McLaury's appointment became effective on August 1.

### Me. C. Seeks Bus Authorization

The Interstate Commerce Commission has assigned the application of the Maine Central Transportation Company for a certificate authorizing operation as a common carrier in interstate commerce in Maine, New Hampshire, and Massachusetts for hearing on August 17 at Augusta, Maine, before Joint Board No. 69.

### Additional Drought-Relief Rates

Secretary Wallace on August 5 announced that the Department of Agriculture Drought Committee had been notified by E. B. Boyd, chairman of the Western Traffic Executive Committee, that Western railroads have approved freight rate reductions on hay and forage shipped to drought counties in Colorado, Kansas, Minnesota, Missouri and Nebraska, in addition to rates already in effect to other states.

### Hearings on Eastern Storeroom Tariffs Concluded

Hearings in connection with the Interstate Commerce Commission's investigation of pick-up and delivery service on Eastern railroads were concluded on August 5 with testimony from a number of railroad witnesses in rebuttal of previous testimony by representatives of trucking interests that operation of the service would be unprofitable to the railroads. It was stated that such testimony had overestimated the cost of performing the service and had ignored factors making for more economical handling of I.C.C. freight.

### Pacific Railway Club

The Pacific Railway Club will hold its next regular meeting at the Palace Hotel, San Francisco, Calif., on Thursday eve-

ning, August 13. This meeting is for road foremen of engines and air brake supervisors and all interested in the subjects that they deal with. Charles A. Fogus, Southern Pacific, will talk about the streamliner "City of San Francisco"; Lee Pearson, Santa Fe, will speak on the streamliner "Super Chief"; Alfred C. Laydon, Westinghouse Air Brake Company, will speak on Braking High-Speed Trains and Frank L. Ryan, Southern Pacific, will speak on Train Handling.

### New British Locomotives

Two new locomotives have recently been completed in the shops of the London & North Eastern of Great Britain. One, which has been named the "Green Arrow," is of the 2-6-2 type and has been designed for hauling fast passenger and freight trains; the other, called "Lord President," is of streamlined design and will be used for hauling fast passenger trains over the east coast route between Edinburgh and Aberdeen.

The "Green Arrow" is described as the first locomotive of its class to be built in Great Britain. It has three cylinders 18½ in. in diameter and with a 26 in. stroke, and a total weight in working order of 144 tons. An additional 32 locomotives of this type are to be constructed in L. N. E. shops.

The "Lord President," described as a modification of the "Earl Marischal," comprises with the latter and the "Cock o' the North" the "most powerful passenger locomotives in Great Britain." Its streamlining is similar to that of the "Silver Link" which hauls the L. N. E.'s "Silver Jubilee" train. It has three cylinders, each 21 in. by 26 in., and a total weight in working order of 167 tons. Three other locomotives of this type are under construction. All have been designed by Sir H. N. Gresley, chief mechanical engineer of the London & North Eastern.

### Scheduled Air Lines Carry 97,453 Passengers in June

Scheduled air lines in the United States carried 97,453 passengers and 701,142 lb. of express, and flew 40,252,357 passenger-miles during June, 1936, the Bureau of Air Commerce has announced. The 21 domestic air lines—those operating within the borders of continental United States—also flew 344,433,493 express pound-miles. The total of miles flown was 5,619,896. In June, 1935, the 22 companies operating at that time carried 73,896 passengers, 330,970 lb. of express, and flew 31,225,699 passenger-miles, 186,310,017 express pound-miles, and a total of 4,993,328 miles. During June of this year 68 per cent of available seats were occupied, as against 60 per cent for June of the previous year. Complete figures for June, 1936, and June, 1935, and the first six months of 1936 and 1935, follow:

	June 1936	June 1935	First Half 1936	First Half 1935
Companies operating .....	21	22	.....	.....
Companies reporting .....	21	22	.....	.....
Passengers carried .....	97,453	73,896	421,587	319,484
Passenger-miles flown .....	40,252,357	31,225,699	179,509,746	139,436,311
Express carried (pounds) .....	701,142	330,970	2,911,775	1,412,969
Express pound-miles flown .....	186,310,017	1,542,874,591	868,769,804	.....
Miles flown .....	5,619,896	4,993,328	29,078,403	24,642,134
Passenger seat-miles flown .....	59,094,819	52,254,552	302,541,881	249,921,288
Per cent—seats used .....	68	60	59	56

### Emergency Rate Petition Denied

The Interstate Commerce Commission on August 3 announced its denial of the petition filed by the railroads on July 27 asking the commission to modify its outstanding orders so as to clear away certain procedural steps to enable the railroads to translate into permanent rates the emergency freight charges which will expire on December 31.

A committee representing the railroads is to meet at an early date to decide on their course of procedure in view of the denial of their petition. The commission's orders contain nothing to prevent the railroads from filing new tariffs covering the rates on which they desire to translate the emergency increases into permanent rates, subject to complaint and possible suspension.

### Bureau of Motor Carriers Opens Additional District Offices

The Bureau of Motor Carriers of the Interstate Commerce Commission has announced the opening of additional District Offices in the field, as indicated below:

District No. 2—New York, N. Y. District Director R. K. Hagarty, in charge.

District No. 10—Kansas City, Mo. District Director James F. Miller, in charge.

District No. 12—Fort Worth, Texas. District Director Tilden F. Childs, in charge.

District No. 13—Denver, Colorado. District Director Daniel P. Harris, Jr., in charge.

District No. 15—Portland, Oregon. District Director Frank E. Landsburg, in charge.

District No. 16—San Francisco, Calif. District Director Richard T. Eddy, in charge.

The following additional district offices are to be opened on August 10:

District No. 1—Boston, Massachusetts. District Director Geo. R. Nuzum in charge.

District No. 4—Pittsburgh, Pennsylvania. District Director R. M. Snetzer in charge.

District No. 14—Salt Lake City, Utah. District Director B. L. Penn in charge.

### R. F. C. Will Consider Loan Applications from Motor Carriers

Loan applications from established motor carriers operating on regular schedule will be considered under Section 5d of the Reconstruction Finance Corporation act, as amended, when all of the proceeds of such loans will be expended in part payment of the purchase price of new equipment, the corporation announced on August 5.

No loans will be considered for the purpose of enabling such applicants to further extend their service beyond existing routes. It will be required that such loans be so secured as reasonably to assure repayment and that the new equipment purchased be included in the collateral. Insurance against ordinary risks must be carried and the final maturity of such loans shall not be later than the expected life of the equipment to be purchased. All credit factors must be satisfactory and applicants will be required to submit evidence of compliance with all applicable

statutes and regulations. Applications will not be considered from carriers engaged in intra-urban business.

### Centenary Exhibit at Montreal

Adopting the role of a locomotive engineer, S. J. Hungerford, president of the Canadian National, last week in Montreal set in motion a working model of the "Dorchester," first Canadian locomotive, thus opening the Railway Exhibition in the Chateau de Ramezay (a Montreal historical museum) which will continue until September 1.

The ceremony was arranged by the Antiquarian and Numismatic Society of Canada in connection with the centenary celebrations of Canada's first railroad, the Champlain & St. Lawrence.

Dr. Victor Morin, president of the society, presided at the brief ceremony. Mr. Hungerford, in opening the exhibition, which consists of models, charts, docu-

ments, seals and various relics of the past century, pointed out that without the railroad the great industrial expansion of the past 100 years would have been impossible.

Other speakers included J. E. Labelle, C. N. R. trustee; J. M. R. Fairbairn, chief engineer for the Canadian Pacific Railway Co.; and L. O. Regnier, chairman of the French-Canadian section of the Railway Centenary Committee.

### Railroads Still Show Net Deficit for Five Months

Class I railroads for the first five months of this year had a net deficit after fixed charges of \$32,658,596, as compared with a net deficit of \$56,194,880 for the corresponding period of last year, according to the Interstate Commerce Commission's monthly compilation of selected income and balance-sheet items. For the month of May there was a deficit of \$2,419,574, as compared with a deficit of \$4,667,992 in

### SELECTED INCOME AND BALANCE-SHEET ITEMS OF CLASS I STEAM RAILWAYS

Compiled from 138 Reports (Form IBS) Representing 144 Steam Railways  
TOTALS FOR THE UNITED STATES (ALL REGIONS)

For the month of May 1936	1935	For the five months of 1936	1935
\$41,842,148	\$39,598,511	1. Net railway operating income.....	\$187,931,356
11,311,118	11,653,854	2. Other income .....	56,898,611
53,153,266	51,252,365	3. Total income .....	244,829,967
1,533,112	1,390,340	4. Miscellaneous deductions from income	7,831,872
51,620,154	49,862,025	5. Income available for fixed charges	236,998,095
11,406,319	11,303,366	6. Fixed charges:	
41,415,076	42,010,195	6-01. Rent for leased roads.....	55,884,240
218,502	216,625	6-02. Interest deductions .....	207,647,413
53,039,897	53,530,186	6-03. Other deductions .....	1,093,179
* 1,419,743	* 3,668,161	6-04. Total fixed charges.....	264,624,832
* 999,831	* 999,831	7. Income after fixed charges.....	* 27,626,737
* 2,419,574	* 4,667,992	8. Contingent charges .....	5,031,859
16,171,620	16,310,938	9. Net income.....	* 32,658,596
2,295,116	1,273,546	10. Depreciation (Way and structures, and Equipment) .....	80,694,433
11,705,152	13,677,751	11. Federal income taxes.....	8,790,671
7,819,909	3,559,611	12. Dividend appropriations:	
		12-01. On common stock.....	28,087,655
		12-02. On preferred stock.....	12,729,411
		Balance at end of May	
		1936	1935

#### Selected Asset Items

13. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707).....	\$689,538,566	\$763,962,004
14. Cash .....	\$437,315,902	\$352,684,887
15. Demand loans and deposits.....	3,774,699	10,851,936
16. Time drafts and deposits.....	30,787,294	38,516,633
17. Special deposits .....	87,745,060	63,327,800
18. Loans and bills receivable.....	3,378,911	4,901,185
19. Traffic and car-service balances receivable.....	59,467,891	54,025,740
20. Net balance receivable from agents and conductors.....	50,890,069	45,917,809
21. Miscellaneous accounts receivable.....	146,683,844	144,450,684
22. Materials and supplies.....	299,881,095	302,399,810
23. Interest and dividends receivable.....	28,695,324	41,575,309
24. Rents receivable .....	2,411,169	2,575,193
25. Other current assets .....	6,033,957	4,614,083
26. Total current assets (items 14 to 25).....	\$1,157,065,215	\$1,065,841,069

#### Selected Liability Items

27. Funded debt maturing within 6 months:	\$277,033,718	\$217,005,139
28. Loans and bills payable.....	\$242,432,497	\$320,570,268
29. Traffic and car-service balances payable.....	75,488,529	67,682,597
30. Audited accounts and wages payable.....	241,543,791	230,402,264
31. Miscellaneous accounts payable.....	87,312,416	62,290,863
32. Interest matured unpaid.....	458,113,818	339,452,497
33. Dividends matured unpaid.....	2,145,525	4,640,543
34. Funded debt matured unpaid.....	440,319,309	291,185,816
35. Unmatured dividends declared.....	19,798,911	15,897,423
36. Unmatured interest accrued.....	119,662,619	122,078,586
37. Unmatured rents accrued.....	41,264,762	40,142,909
38. Other current liabilities .....	21,167,100	18,185,245
39. Total current liabilities (items 28 to 38).....	\$1,749,049,277	\$1,502,529,011
40. Tax liability (Account 771):		
40-01. U. S. Government taxes.....	\$59,262,245	\$37,088,535
40-02. Other than U. S. Government taxes.....	134,280,931	138,266,215

<sup>†</sup> The net income as reported includes charges of \$1,454,945 for May, 1936, and \$7,148,016 for the five months of 1936 on account of accruals for excise taxes levied under the Social Security Act of 1935; also \$4,080,835 for May, 1936, and \$12,068,063 for the five months of 1936 under the requirements of an Act approved August 29, 1935, levying an excise tax upon carriers and an income tax upon their employees, and for other purposes. (Public No. 400, 74th Congress). The net income for May, 1935, includes credits of \$8,622,514, and for the five months of 1935 credits of \$4,429,827, on account of reversal of charges previously made for liability under the Retirement Act of 1934.

<sup>‡</sup> Includes payments which will become due on account of principal of long-term debt (other than that in Account 764, Funded debt matured unpaid) within six months after close of month of report.

<sup>§</sup> Includes obligations which mature not more than 2 years after date of issue.

<sup>¶</sup> Deficit or other reverse items.

## NET INCOME OF LARGE STEAM RAILWAYS WITH ANNUAL OPERATING REVENUES ABOVE \$25,000,000

Name of railway	Net income after depreciation		Net income before depreciation	
	For the five months of 1936	1935	For the five months of 1936	1935
Alton R. R.	\$749,468	\$1,029,945	\$608,279	\$888,404
Atchison, Topeka & Santa Fe Ry. System	2,815,955	897,551	1,911,425	3,939,786
Atlantic Coast Line R. R.	828,308	195,623	1,719,460	1,135,764
Baltimore & Ohio R. R.	2,182,671	2,570,144	895,299	321,861
Boston & Maine R. R.	2,698,800	333,408	2,014,175	344,506
Central of Georgia Ry.†	1,103,023	1,201,205	782,108	865,207
Central R. R. of New Jersey	1,377,346	562,519	736,915	126,431
Chesapeake & Ohio Ry.	15,016,910	10,214,578	18,540,820	13,615,239
Chicago & Eastern Illinois Ry.‡	523,958	664,575	275,773	409,456
Chicago & North Western Ry.‡	8,164,812	5,403,384	6,083,677	3,293,681
Chicago, Burlington & Quincy R. R.	499,815	2,085,849	1,413,717	15,623
Chicago Great Western R. R.‡	695,688	820,062	489,706	602,414
Chicago, Milwaukee, St. Paul & Pacific R. R.‡	7,780,378	7,464,648	5,538,742	5,121,131
Chicago, Rock Island & Pacific Ry.‡	7,734,766	6,952,628	5,939,779	5,104,691
Chicago, St. Paul, Minneapolis & Omaha Ry.	1,474,424	1,234,979	1,225,109	971,621
Delaware & Hudson R. R.	768,939	953,863	305,954	543,697
Delaware, Lackawanna & Western R. R.	410,607	633,511	703,314	492,501
Denver & Rio Grande Western R. R.‡	2,179,592	1,983,045	1,697,371	1,486,747
Elgin, Joliet & Eastern Ry.	611,029	831,418	986,490	1,201,482
Erie R. R. (including Chicago & Erie R. R.)	28,171	743,906	1,595,432	959,862
Grand Trunk Western R. R.	761,665	149,261	1,249,262	301,057
Great Northern Ry.	3,512,112	3,910,054	1,971,845	2,403,388
Illinois Central R. R.	1,587,119	1,442,512	1,158,990	1,366,813
Lehigh Valley R. R.	279,190	444,054	680,091	533,274
Long Island R. R.	543,053	891,166	57,973	389,647
Louisville & Nashville R. R.	2,592,121	1,075,535	4,335,266	2,864,719
Minneapolis, St. Paul & Sault Ste. Marie Ry.	2,837,813	3,006,660	2,327,032	2,550,333
Missouri-Kansas-Texas Lines	1,274,722	2,282,275	739,358	1,737,293
Missouri Pacific R. R.‡	5,796,415	7,080,882	4,044,669	5,276,644
New York Central R. R.¶	684,862	3,423,198	6,057,194	3,509,990
New York, Chicago & St. Louis R. R.	970,017	1,521	1,614,643	679,252
New York, New Haven & Hartford R. R.‡	3,813,916	1,578,878	2,378,935	72,148
Norfolk & Western Ry.	12,021,689	7,755,018	13,894,136	9,631,343
Northern Pacific Ry.	4,615,072	5,370,406	3,311,252	4,043,980
Pennsylvania R. R.	8,958,813	7,761,272	17,950,125	16,665,528
Pere Marquette Ry.	1,102,205	383,187	2,158,073	1,456,272
Pittsburgh & Lake Erie R. R.	1,408,998	1,062,466	2,160,937	1,774,284
Reading Co.	2,429,263	1,854,063	3,760,184	3,098,779
St. Louis-San Francisco Ry.†	3,896,835	5,167,752	2,507,564	3,849,072
St. Louis Southwestern Lines†	148,489	196,769	104,524	64,658
Seaboard Air Line Ry.†	2,647,295	2,335,448	1,864,939	1,566,682
Southern Ry.	176,591	2,146,807	1,176,561	973,823
Southern Pacific Transportation System	2,126,786	3,433,305	1,159,084	289,601
Texas & Pacific Ry.	450,406	43,441	936,336	545,432
Union Pacific R. R.	1,010,137	2,343,647	3,659,180	5,044,645
Wabash Ry.†	1,004,879	996,691	114,349	93,866
Yazoo & Mississippi Valley R. R.	334,143	1,224,261	121,422	1,014,211

† Report of receiver or receivers.

‡ Report of trustee or trustees.

§ Includes Atchison, Topeka &amp; Santa Fe Ry., Gulf, Colorado &amp; Santa Fe Ry., and Panhandle &amp; Santa Fe Ry.

¶ Includes Boston &amp; Albany, lessor to New York Central R. R.

|| Includes Southern Pacific Company and Texas &amp; New Orleans R. R. The operation of all separately operated solely controlled affiliated companies, resulted in a net deficit of \$1,690,121 for five months of 1936 and \$1,675,628 for five months of 1935. These figures are not reflected in this statement.

\* Deficit.

May, 1935. For the five months period 54 roads reported a net income and 81 roads reported a net deficit, while for the corresponding period of last year only 43 roads reported a net income and 92 reported deficits. For May, 59 roads reported a net income. The commission's compilations are shown in the accompanying tables.

### Railroads and Water Lines Authorized to Substitute Highway Service

For a temporary period expiring December 31, 1936, the Interstate Commerce Commission has issued special permission orders authorizing the railroads and the carriers in the New York Inland Water Carriers Association to publish on short notice effective August 28 a tariff rule providing for the optional substitution of highway vehicle service for rail or water transportation of l.c.l. freight at the usual rates. This is in extension of a previous temporary arrangement which expires on August 28, and was vigorously opposed by the American Trucking Associations, Inc. The railroads, through W. S. Curlett, tariff-publishing agent, had asked on July 16 for authority to extend the tariff rule indefinitely, or at least for another year, but the commission limited its permission order, pending the decision of various legal

questions which have been raised in other cases regarding service performed partly by rail and partly by highway. The railroad tariff rule provides that wherever as to less-than-carload freight an originating or delivering carrier substitutes, at its option, highway vehicle service for service by railroad between stations on its line, the rates and charges as published in the tariff will apply when the substitute service is performed either entirely by highway vehicle or partly by highway vehicle and partly by railroad; the highway vehicle service in all cases to be limited to the most practicable highway routing near to the line of the railroad making the substitution.

### The Canadian Roads in June

The Canadian Pacific in June had net operating income totaling \$1,175,549, as compared with \$1,403,812 for June of last year, a decrease of \$228,262. Gross revenues for June at \$10,957,610 showed an increase of \$767,738 over June of last year, while operating expenses at \$9,782,060 revealed an increase of \$996,001.

For the first six months of 1936, net revenues amounted to \$6,790,999, as compared with \$6,062,018 for the corresponding period of last year, an increase of \$728,981. Gross for the six-month period

at \$62,044,346 showed an increase of \$5,515,722, while operating expenses at \$55,253,347 were \$4,786,741 over the total for the corresponding six-month period of last year.

Operating revenues of the Canadian National all-inclusive system for June, 1936, totaled \$14,739,765; operating expenses totaled \$14,730,323, and net operating revenue \$9,442. As compared with June, 1935, these results showed an improvement of \$1,027,511 in operating revenues and \$505,127 in net revenue.

For the first six months of this year operating revenues amounted to \$85,461,428, an increase of \$5,329,633 over the corresponding period of last year. Operating expenses during the half year amounted to \$82,986,388, showing an increase of \$5,022,130 over the half-yearly period of 1935. There was net revenue at the end of June, 1936, of \$2,475,040, as compared with \$2,167,537 in 1935, an increase of \$307,503.

### Live Fish by Carload, for Market

The Pennsylvania delivered at the Dock Street fish market in Philadelphia on August 5 a carload of live fish from Green Bay, Wis., the shipment consisting of 15,000 lb. of live carp. The fish were transported in a 70-ft. baggage car fitted up with nine tanks 10-ft. long by 3-ft. 4-in. wide, each holding 700 gallons of water.

The car has accommodations for an attendant and for a supply of ice sufficient to keep the water at an even temperature.

### Reduced Suburban Fares on Reading

The Reading Company announces that, beginning September 1, round trip tickets good for one day, and family tickets for 20 rides, good for six months, are to be sold at stations in and near Philadelphia at from 10 to 20 per cent below present regular fares. For example: Rate between Reading Terminal, Philadelphia, and Jenkintown, 11 miles, 35 cents; (each family ticket costs 10 times the round trip rate); Lansdale, 24 miles, 75 cents; Doylestown, 34 miles, \$1.00; Newtown, 26 miles, 80 cents; and Morristown, 17 miles, 50 cents. The one day round trip tickets, valid five days, Monday-Friday, are not to be good on trains in the rush hours, namely, those arriving at Philadelphia between 8:00 a.m. and 9:30 a.m. and those leaving between 4:30 p.m. and 6:30 p.m.

### N. Y. Commission Report on Proposed Highway Carrier Safety Rules

The Public Service Commission of New York has approved a report of its chief engineer commenting on proposed safety regulations of the Interstate Commerce Commission applicable to motor carriers and has advised the federal commission that the state commission will insist that all buses, whether engaged in interstate or intrastate traffic, in the state of New York shall comply with the rules and regulations of the Public Service Commission.

The tentative rule of the federal commission most severely criticized by the state commission proposes to require that motor vehicles proceeding in convoy shall maintain, so far as possible, a distance of

at least 200 ft. between units of convoy. The state body requires that no trucks shall be closer together than 500 ft. on the highway. The report states that 200 ft. is too close and that if it is realized that a fleet of 4 or 5 large vehicles, each about 40 ft. in length, are proceeding on a heavily traveled highway, it will be appreciated that vehicles following such a caravan are in a hazardous position, for to fall in line with any number of trucks in a space not exceeding 200 ft., when they are traveling 45 m.p.h. (the speed limit proposed in the tentative federal regulations), is a dangerous operation.

The Interstate Commerce Commission rules would require that safety glass be installed in the windshield, rear window, doors and window next to the driver. The Public Service Commission requires safety glass in all openings where glass is used. The proposed rules of the Interstate Commerce Commission provide a minimum of two flares and two red flags to be carried by motor vehicles operating outside cities, towns or villages. The state commission believes that the requirement should be a minimum of three red flags and three flares.

### Railways Fight Train-Limit Law in Louisiana

Pursuant to a complaint filed by nine railways operating in Louisiana, the United States district court has entered a restraining order, effective on July 28, prohibiting the enforcement of the Louisiana train-limit law, pending action on a motion for a temporary injunction. This statute, which was signed by the governor on June 20, limits freight trains to 70 cars exclusive of the caboose, and passenger trains to 16 cars, and provides further that an additional helper shall be provided in all switch crews that operate over public crossings. By a special proviso, all roads that have less than 100 miles of main tracks within the state are exempted from the provisions of the law, the roads thus exempted being the New Orleans Northeastern (Southern), the Louisville & Nashville, the St. Louis Southwestern, the New Orleans Terminal, the Texas Pacific-Missouri Pacific Terminal, the Louisiana Southern, the Louisiana Northwestern and the New Orleans Public Belt.

The nine railways that are contesting the law are the Texas & New Orleans (Southern Pacific), the Kansas City Southern, the Illinois Central, the Yazoo & Mississippi Valley, the Texas & Pacific, the Louisiana & Arkansas, the Missouri Pacific, the Gulf Coast Lines, and the Gulf, Mobile & Northern. The law is being attacked on the ground that the exemption of certain railroads makes it discriminatory, while the train-limit feature of the act is being contested on the grounds that it interferes with interstate commerce, that it is extra-territorial in its effect (since it would affect the operation of trains over engine districts extending beyond the state lines), and that the law does not affect safety of operation. The portion of the act relating to switch crews is being attacked on the ground that it is unnecessary.

## Equipment and Supplies

### Equipment Orders Forged Ahead During Last Month

Placements included 9 locomotives, 4,469 freight cars and 34 passenger-train cars

Domestic orders for 9 locomotives, 4,469 freight cars and 34 passenger train cars were reported in July issues of the *Railway Age*. Thus, this year's equipment business, having previously surpassed last year's 12-months volume, forged further ahead during the past month. Also, with

orders are 104 steam locomotives and 27 of other types. As pointed out last month, the 1936 orders for steam locomotives are in excess of those for the entire 12 months of any year since 1930; and this year's total of orders for locomotives of all types—131—is about 58 per cent above last year's 12-months total of 83. Furthermore, among the past five years, it is exceeded only by orders placed in 1934 and 1931—183 and 176, respectively. On August 1, domestic inquiries for 11 steam locomotives were outstanding, while plans have been announced for the purchase of three others; also, there was an inquiry for three locomotives for export.

Thus far in 1936 orders for a total of 141 passenger-train cars have been reported, excluding articulated units for streamlined trains. This is more than twice the 63 passenger-train cars ordered during last year's entire 12 months and is

### Domestic Equipment Orders Reported in Issues of The Railway Age in July, 1936

LOCOMOTIVES			
Date	Name of Company	No.	Type
July 18	Union Pacific	1	Diesel-electric
July 25	Pittsburgh & West Virginia	2	2-6-6-4
July 25	Richmond, Fredericksburg & Potomac	5	4-8-4
Aug. 1	Union Pacific	1	Steam turbine electric

FREIGHT CARS			
Date	Name of Company	No.	Type
July 4	Lehigh & New England	250	Hopper
July 4	General Chemical Co.	3	Tank
July 4	Northern Pacific	500	Gondola
		250	Flat
July 11	Cambria & Indiana	300	Hopper
July 11	St. Louis Southwestern	50	Automobile
July 11	Central of Georgia	200	Hopper
July 11	Minneapolis, St. Paul & Sault Ste. Marie	500	Box
July 11	Wisconsin Central	250	Box
July 11	Western Maryland	25	Caboose
July 11	American Refrigerator Transit Co.	511	Refrigerator
		510	
July 18	Aluminum Ore Co.	50	Covered Hopper
July 18	Atchison, Topeka & S. F.	10	Covered Hopper
July 25	Minneapolis & St. Louis	60	Hopper
July 25	Norfolk & Western	800	Box
		100	Auto-box
		100	Box

PASSENGER-TRAIN CARS			
Date	Name of Company	No.	Type
July 4	Southern Pacific	24	Chair, Parlor, Parlor-Observation, Dining, Tavern
July 18	Seaboard Air Line	6	Coaches
		4	Passenger-baggage

July orders, the 1936 rail tonnage ordered passed 1935's 12-months total.

During the first seven months of this year orders have been placed for a total of 31,029 freight cars as compared with 18,699 ordered throughout last year. Also, since the compilation of these figures, there has been reported an additional order for 3,000 cars, as noted elsewhere in these columns. Furthermore, there were in July export orders for 110 freight cars, making a total of 516 ordered here for export this year; last year 110 cars were ordered here for export during the entire 12 months. There were outstanding on August 1 inquiries for 575 freight cars and plans have been announced for the acquisition of 1,000 others.

The nine locomotives ordered in July brought the year's total to date to 131, excluding power units for streamlined trains. Included in this year's locomotive

larger than the total for any year since 1930, except 1934 when 388 passenger-train cars were ordered. On August 1, inquiries for 9 passenger-train cars were outstanding.

The July rail orders—44,500 tons—brought the year's seven months' total to 512,985 tons as compared with the 495,300 tons placed throughout 1935.

### LOCOMOTIVES

THE UNITED FRUIT COMPANY is inquiring for 5 or 10, and possibly an additional 5, locomotives of the 2-8-2 type for service in Guatemala.

### FREIGHT CARS

THE UNION TANK CAR COMPANY has ordered 3,000 tank cars of 6,500 gal. ca-

pacity from the American Car & Foundry Company.

## IRON & STEEL

THE SEABOARD AIR LINE is inquiring for 6,280 tons of 100-lb. rail.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 5,000 tons of rails.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 3,000 tons of rails from the Carnegie-Illinois Steel Company, the Bethlehem Steel Company and the Inland Steel Company.

## Construction

CALIFORNIA & OREGON COAST.—The city of Grants Pass, Ore., and the Crescent City, Calif., Harbor District have applied to the Interstate Commerce Commission for a certificate authorizing the construction of an extension of the California & Oregon Coast from Crescent City, Calif., to Waters Creek, Ore., 81.6 miles, proposing that the construction in Oregon be done by the city and that in California be done by the harbor district. It was stated that the W.P.A. administrations of Oregon and California had applied for a federal grant of \$3,630,711 to defray the labor costs and that the applicants had applied to the Reconstruction Finance Corporation for a loan of \$3,750,117 for equipment, materials, and supplies.

GEORGIA & FLORIDA.—Receivers of this property have been authorized by the Interstate Commerce Commission to build a line from Kingwood, Ga., to Moultrie, 1.7 miles; estimated cost, \$44,706.

NEW YORK CENTRAL-ERIE.—The Public Service Commission of New York has denied a petition of the New York Central for a rehearing on its order directing the elimination of grade crossings of N. Y. C. and the Erie in the city of Dunkirk, N. Y. See *Railway Age* of June 27, page 1073.

NEW YORK CENTRAL.—The Public Service Commission of New York has approved the revised plans and estimate of cost in the amount of \$44,500 for reconstruction work on the bridge carrying Midler avenue, Syracuse, N. Y., over the tracks of this road. This work is part of the general grade crossing elimination program in Syracuse. The order of the commission authorizes the N. Y. C. to do the work of supporting the tracks on struts at actual cost without contract—the amount which the railroad may spend in this connection being \$3,500, in accordance with an estimate submitted by it for the work.

WABASH.—A contract has been awarded to the Ross and White Company, Chicago, for the design and construction of an automatic electric skip hoist type locomotive coaling and sanding plant of steel construction, having a capacity of 100 tons, to be built at Burlington Junction, Mo.

## Supply Trade

THE R AND C COMPANY, 1218 Olive street, St. Louis, Mo., has been appointed representative in that region of the **Blacker Engineering Corporation**, 123 Liberty street, New York City, for the sale of Blacker "B" power sledges.

C. R. Jernberg, formerly vice-president of the Standard Forgings Company, is now associated with the **Kropp Forge Company** of Chicago. Mr. Jernberg is directing Kropp sales in the territory contiguous to Chicago, having charge of contract and production sales.

BLAKE C. HOWARD has been placed in charge of all railroad business for **L. C. Chase & Company, Inc.**, selling division of **Goodall-Sanford Industries** in the St. Louis, Mo., area. Mr. Howard's headquarters will be in the Railway Exchange building, St. Louis.

FRANK C. MILLER has been appointed manager of sales of the tin plate division of the **Republic Steel Corporation**, Cleveland, Ohio, succeeding **George E. Totten**, resigned. Mr. Miller was formerly associated with the sales office at Detroit, Mich. **P. H. Hubbard** and **J. B. DeWolf** have been appointed assistant managers of the tin plate division.

The receivership of the **Erie Malleable Iron Company**, Erie, Pa., was terminated on July 24, by the United States District Court for the Western district of Pennsylvania. Reorganization was effected immediately with the following officers: **Enoch C. Filer**, president; **Charles G. Strickland**, vice-president; **J. H. Redhead**, executive vice-president and general manager; and **R. H. Eisenlord**, secretary and treasurer.

PAUL C. CADY, who has been elected vice-president in charge of sales for the eastern district of the **Union Railway Equipment Company**, Chicago, with headquarters in New York, was educated

ment of the New York Central at New York, and in 1919 resigned as assistant to the chief mechanical engineer of this road, to enter the railway supply business. Since that time he has been engaged in the railway supply business in New York, at the present time also being president of the Midland Supply Company.

## OBITUARY

ROBERT S. MURRAY, former treasurer of the General Electric Company, died on July 29, at his home in Schenectady, N. Y. Mr. Murray, who had been in poor health for about a year, retired from his position for that reason on May 1.

ROBERT J. SHARPE, manager of sales of the General American Tank Car Corporation for the Tulsa district, died suddenly at Palmer Lake, Colo., on July 27. Mr. Sharpe had been connected with this company for 25 years.

JOHN W. KINCade, who invented one of the first automatic locomotive stokers, died at his home in Cincinnati on July 31, at the age of 68. While working as a locomotive engineer on the Chesapeake & Ohio he devised a stoker, which was at first worked by hand, but later by steam. Several were used on this road with the long firebox locomotives, but were discontinued when the wider firebox design was introduced. The stoker was improved and became known as the Day-Kincade, and later on as the Victor, but never got beyond experimental use.

ROBERT A. BECKER, of the Fargo Manufacturing Company, Poughkeepsie, N. Y., died suddenly on August 1, at the age of 71, having been seized with an attack of the heart while out walking. Mr. Becker was long connected with the Hall Signal Company and was one of the earliest members of the Railway Signaling Club (1897). He had charge of signal construction work on the Lehigh Valley, the New York Central, the Illinois Central and a number of other roads. Later he was assistant superintendent of construction for the General Railway Signaling Company. He was the founder of the Fargo Manufacturing Company, which carried on an extensive business in signal accessories.

## TRADE PUBLICATION

MODERN PAYROLL METHODS.—A descriptive folder (Form 7067) showing payroll accounting plans for all types and all sizes of businesses has been published by Burroughs Adding Machine Company. The folder is well illustrated with representative forms for compiling information required by Social Security laws. One set of forms illustrates how to write check (or envelope), employee's statement, earnings record and payroll sheet—all in one operation. Machines ranging from an inexpensive desk bookkeeping machine to an automatic accounting machine are also pictured. Copies are available without charge or obligation from the Advertising Department, Burroughs Adding Machine Company, Detroit, Mich.

at Baldwin University Law School and began his railway career in the mechanical department of the Lake Shore & Michigan Southern at Cleveland, Ohio. Later he was employed in the mechanical depart-



Bachraen  
Paul C. Cady

## Financial

**ATCHISON, TOPEKA & SANTA FE.—Acquisition.**—The Southern Kansas Stage Lines, Inc., has applied to the Interstate Commerce Commission for authority to acquire by purchase the properties of three truck lines in Oklahoma, the Harris Truck Line, the Hewitt Truck Line, and the Burton Truck Line.

**CENTRAL OF GEORGIA.—Equipment Trust.**—The receiver has applied to the Interstate Commerce Commission for authority for an issue of \$400,000 of equipment trust certificates at 4 per cent in connection with the acquisition of 200 50-ton hopper bottom coal cars.

**CHESAPEAKE & OHIO.—Bonds.**—The Interstate Commerce Commission has authorized this company to issue \$29,500,000 of refunding and improvement mortgage 3½ per cent series E bonds, maturing 1996. The proceeds of the issue are to be used to retire 4½ and 5 per cent bonds, and thus save interest charges. The issue is authorized for sale to Morgan, Stanley & Co. at 97.5, which will make the average annual cost of the money to the railway 3.59 per cent.

**CHICAGO & ILLINOIS MIDLAND.—Bonds.**—Halsey, Stuart & Co. and five associated companies have, subject to the approval of the Interstate Commerce Commission and the Illinois Commerce Commission, offered at 99½ an issue of \$5,500,000 of first mortgage sinking fund 4½ per cent series A bonds of this company due 1956. The Interstate Commerce Commission has authorized this issue of bonds by the railroad, to be sold to the underwriters at 96.75, making the interest cost 4.75 per cent. The commission has also authorized the road to issue \$1,500,000 of 6 per cent income debentures and 24,000 shares of \$100-par capital stock, these latter securities to be delivered to the proprietor company in payment of advances.

**CHICAGO UNION STATION.—Bonds.**—Kuhn, Loeb & Co. and five associated companies have offered, subject to approval of the Interstate Commerce Commission, \$7,000,000 of 3½ per cent bonds guaranteed by the proprietary companies, due 1951. The offering price is 102.

**ERIE.—Control of West Clarion.**—The Interstate Commerce Commission has authorized this company to acquire control of the West Clarion (merger of the Brockport & Shawmut with which has recently been authorized) by purchase of its capital stock.

**MINNEAPOLIS & ST. LOUIS.—Dismemberment Hearings.**—Rebuttal testimony by members of Associated Railways, Inc., was concluded at the hearings being held by the Interstate Commerce Commission at Minneapolis, Minn., on July 30. Some testimony presented supported claims that rates and routes as advantageous as those now furnished by the M. & St. L. to stations on its lines will be available after the transfer to new owners, while other testimony was designed to show that the Minneapolis & St. Louis has been under-

maintained. Those who testified that the rates and routes will continue satisfactory to the communities included E. W. Soergel, assistant freight traffic manager of the Chicago, Milwaukee, St. Paul & Pacific; George A. Hoffelder, assistant freight traffic manager of the Chicago, Burlington & Quincy; and M. V. Gunderson, commerce assistant of the Chicago & North Western. Mr. Soergel said that points west of Minneapolis on the M. & St. L. in Minnesota and South Dakota will have the same milling or other processing-in-transit privileges and the same local and proportional rates on shipments of grain and other products to Minneapolis and other markets. Also the M. & St. L. territory will have the same arrangements as now on freight moving to all large consuming centers. The commerce moving between Minneapolis and northwestern Iowa over the M. & St. L. can and will be handled by the Milwaukee and other lines, he said. Similar testimony, as to adequate service to be furnished by the Burlington in the territory east of Oskaloosa, Iowa, and by the Omaha-North Western in southwestern Minnesota and northwestern Iowa was submitted by Messrs. Hoffelder and Gunderson.

Among the witnesses testifying to show that portions of the M. & St. L. are in poor condition because of track maintenance was F. T. Beckett, assistant chief engineer of the Chicago, Rock Island & Pacific, who said that \$135,093 or \$1,195 a mile would have to be spent within the next year to put in good condition the four pieces of Iowa trackage that the Rock Island would take over and operate. Several bridges need repairs or replacement, worn out ties should be replaced, battered rails removed and new ballast applied.

G. M. O'Rourke, district engineer of the Illinois Central lines north of the Ohio, testified that \$82,050 would be required to put the Minneapolis terminal properties in good shape. Approximately \$730,000 would have to be spent over a five-year period to bring the Hopkins-Albert Lea track to a condition necessary for speedy operation of trains, according to B. R. Kulp, engineer maintenance of the Chicago & North Western.

H. R. Clarke, engineer maintenance of way of the Chicago, Burlington & Quincy, using photographs to support his statements, contended that the line between Peoria, Ill., and Oskaloosa, Iowa, was in poor condition because of under-maintenance.

A. D. Emery, assistant engineer of the Milwaukee, testified as to the necessity of considerable maintenance on the line from Norwood to Hanley Falls. Hubert Wuerth, division engineer of the Milwaukee, contended that, while the rail is mostly in fair condition on the Albia-Marshalltown line and at the Oskaloosa terminal, many of the ties are in poor condition and should be replaced. About 12,000 ties are needed at the Oskaloosa terminal alone, Mr. Wuerth said.

Statements that the M. & St. L. has been under-maintained were challenged by officers of the road. John W. Devins, general manager of the line, explained that the improvement budget for 1936 calls

for the installation of a total of 315,000 new ties, or an average of 219 ties per mile for the 1,437 miles of line now comprising the system. This program, he said, is more extensive than that for the pre-depression year of 1929, when 260,435 ties, or 177 per mile, were installed. The improved program for this year, he pointed out, also included the laying of 4,325 tons of new 90-lb. rail and 500 tons of 100-lb. rail, and the reballasting with new cinders of 35 miles of heavy-duty track.

**MARIANNA & BLOUNTSTOWN.—Abandonment.**—The Interstate Commerce Commission has authorized this company to abandon a branch extending from Blountstown, Fla., to Scotts Ferry, 14 miles.

**NEW YORK, CHICAGO & ST. LOUIS.—Notes.**—This company has applied to the Interstate Commerce Commission for authority to issue and sell \$16,000,000 of 10-year 4 per cent collateral trust notes, for the purpose of paying loans from the Reconstruction Finance Corporation and the Railroad Credit Corporation and for other corporate purposes.

**PENNSYLVANIA.—Abandonment.**—The Interstate Commerce Commission has authorized this company to abandon a 1.4-mile segment of its Rainey branch (Fayette county, Pa.).

**PENNSYLVANIA.—Bonds.**—Kuhn, Loeb & Co. has offered, subject to approval of the Interstate Commerce Commission, \$20,000,000 of general mortgage 3½ per cent Series C bonds of this company, due 1970, priced at 101½ to yield 3.67 per cent.

**SOUTHERN.—Abandonment.**—At the request of the applicant the Interstate Commerce Commission has dismissed the application of the Tennessee Valley Authority for a certificate permitting the Southern to abandon its Lafollette branch, in Campbell county, Tenn., in a territory to be flooded. The application was opposed by the Southern.

**SOUTHERN PACIFIC.—Abandonment.**—This company and the Central Pacific have applied to the Interstate Commerce Commission for authority to abandon part of a branch line between Tonopah Junction, Nev., and Benton, Calif., 50 miles.

**WHEELING & LAKE ERIE.—Stock.**—The Interstate Commerce Commission has granted this company's petition to reduce to 102,140 the number of shares of its common stock which it may issue in conversion of a like amount of its 5½ per cent cumulative preferred stock.

### Average Prices of Stocks and of Bonds

	Last Aug. 4	Last week	Last year
Average price of 20 representative railway stocks..	54.11	54.74	35.54
Average price of 20 representative railway bonds..	81.13	80.95	74.36

### Dividends Declared

**Allegheny & Western.**—Guaranteed, \$3.00, semi-annually, payable January 2 to holders of record December 19.

**Boston & Albany.**—\$2.00, payable September 30 to holders of record August 31.

**Dayton & Michigan.**—87½, semi-annually, payable October 1 to holders of record September 15; 8 Per Cent Preferred, \$1.00, quarterly, payable October 7 to holders of record September 15.

**East Mahoning.**—\$1.25, semi-annually, payable December 15 to holders of record December 5.

## Railway Officers

### EXECUTIVE

**J. R. Hayden**, who has been appointed assistant to the president of the Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Cal., as announced in the *Railway Age* of August 1, was born in Jennings County, Ind., on March 13, 1872. Mr. Hayden first entered railway service with the St. Louis-San Francisco as a student telegrapher, later serving in the same capacity with other western railroads. In 1894 he became a telegrapher on the Kansas City, Fort Smith & Memphis (now part of the Frisco), later holding the positions of operator-agent and dispatcher. In 1900 Mr. Hayden went with the Santa Fe as a relief telegrapher at Las Vegas, N. M. For the next several years he held the positions of agent-telegrapher and agent at various points, being



J. R. Hayden

sent to Los Angeles, Cal., in 1905 as traveling freight agent. After two years in the latter capacity he was appointed industrial agent and subsequently became assistant industrial commissioner for the system. In May, 1922, he was appointed assistant traffic manager at San Francisco, the position he was holding at the time of his recent appointment as assistant to the president with the same headquarters.

**Thomas B. Gallaher**, whose appointment as assistant to the vice-president in charge of traffic of the Atchison, Topeka & Santa Fe, with headquarters at Chicago was reported in the *Railway Age* of August 1, has been connected with the Santa Fe continuously for 30 years. He was born on December 2, 1885, at Graham, Tex., and obtained his higher education at Texas Christian University, graduating in 1906, and later attended law school for two years. While attending school, Mr. Gallaher, during his summer vacations, served the Santa Fe as cashier in the freight depot at Weatherford, Tex. His experience during this period also included a summer's work with the Texas & Pacific as a train, baggage and express mes-

senger. In September, 1906, after finishing school, Mr. Gallaher entered the service of the Santa Fe as a clerk of ticket



Thomas B. Gallaher

agents accounts in the accounting department at Amarillo, Tex. Subsequently he served successively as head clerk of freight station accounts, head clerk, rate desk clerk and traveling auditor. On December 1, 1907, he entered the traffic department as traveling freight and passenger agent and rate clerk. On April 1, 1917, he was advanced to division freight and passenger agent and during federal control of the railroads he served as assistant general freight and passenger agent. On July 15, 1920, he was appointed general freight and passenger agent at Amarillo, which position he was holding at the time of his recent appointment as assistant to the vice-president in charge of traffic.

### FINANCIAL, LEGAL AND ACCOUNTING

**A. B. Twyman**, assistant general auditor of the Wabash, with headquarters at St. Louis, Mo., has been appointed acting general auditor, relieving **G. E. Bramon**, who has been granted a leave of absence because of ill health.

**O. G. Edwards**, assistant general attorney of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Seattle, Wash., has been appointed tax commissioner with headquarters, for the time being, at Milwaukee, Wis., to succeed **A. S. Dudley**, who has retired, effective August 1, after 38 years' service with this company.

**Charles A. Magaw**, general solicitor for the Union Pacific at Omaha, Neb., whose retirement was noted in the *Railway Age* of August 1, has served in various capacities in the legal department of the Union Pacific for 25 years. He was born on August 15, 1872, at Fairhaven, Ohio, and was educated at Washburn college, Topeka, Kan., and at the University of Kansas at Lawrence, graduating with a law degree from the latter university in 1897. He began the practice of law in the same year at Topeka, where he later became a member of the firm of Ferry, Doran & Magaw. On August 15, 1911, Mr. Magaw entered the service of the Union Pacific

at Topeka, as an assistant attorney, being appointed assistant general attorney, with the same headquarters on August 1, 1913. Four years later he was transferred to Omaha, where he was advanced to general attorney on August 1, 1918. On January 1, 1933, he was appointed general solicitor, with jurisdiction in Nebraska, Kansas, Iowa, Missouri, Colorado and Wyoming, holding this position until his retirement.

### OPERATING

**A. G. Stuckey**, chief dispatcher on the Southern division of the Kansas City Southern, with headquarters at Shreveport, La., has been promoted to trainmaster, with the same headquarters.

**E. A. Whitman**, acting general manager of the Minneapolis, St. Paul & Sault Ste. Marie, has been appointed general manager, with headquarters as before at Minneapolis, Minn., thereby succeeding to a portion of the duties of the late **A. E. Wallace**, formerly vice-president and general manager of the Soo line. Mr. Whitman is also vice-president of the Duluth, South Shore & Atlantic.

**R. A. Messmore**, superintendent of the Montpelier division of the Wabash, with headquarters at Montpelier, Ohio, has been promoted to assistant general manager, with headquarters at St. Louis, Mo., succeeding **Thomas M. Hayes**, whose appointment as assistant passenger traffic manager is noted elsewhere in these columns. **H. G. Pace**, trainmaster at Springfield, Ill., has been appointed superintendent, St. Louis Terminal division, Wabash Fruit Terminal, at St. Louis, Mo., to succeed **C. A. Johnston**, who has been transferred to the Montpelier division to replace Mr. Messmore.

**Walter O. Frame**, who has been appointed assistant superintendent on the Chicago, Burlington & Quincy at Wymore, Neb., as reported in the *Railway Age* of July 11, was born on October 27, 1890, at Osceola, Iowa. Mr. Frame first entered railway service in 1905 in the track de-



Walter O. Frame

partment of the Burlington at Osceola, serving successively as a section foreman, extra gang foreman, and as foreman in charge of construction until 1911, when he

was made construction roadmaster on grade reduction work for the Kansas City Terminal. Two years later he went with the Chicago, Rock Island & Pacific as an extra gang foreman, returning to the Burlington in 1914 as an extra gang foreman on the St. Joseph division. In 1916 Mr. Frame was advanced to roadmaster on the Hannibal division, and from 1918 to 1921 he served as roadmaster and assistant trainmaster on the Aurora division. At the end of this period he was made inspector of maintenance of way on the staff of the general manager of the Lines East of the Missouri river, then being assigned to the Beardstown division, where he served as trainmaster and roadmaster until 1927. In March of that year he was appointed engineer maintenance of way of the Illinois district, being transferred to the Iowa district in August, 1927, and to the Central district in October, 1931. He was located on the latter district at the time of his recent appointment as assistant superintendent at Wymore.

### TRAFFIC

**Gray E. Loury** has been appointed division freight agent of the Huntington division of the Chesapeake & Ohio, with headquarters at Huntington, W. Va., succeeding **S. J. McBride**, deceased.

Effective August 1 the following changes have been made in the traffic department of the Seaboard Air Line: **W. A. Marshall**, general freight agent, with headquarters at Norfolk, Va., has been appointed assistant to chief freight traffic officer, with the same headquarters. **C. L. Senter**, assistant general freight agent at Norfolk, has been appointed general freight agent at that point to succeed Mr. Marshall. **R. T. Etheridge** has been appointed assistant freight traffic manager in charge of rates and divisions at Norfolk to succeed **R. H. Eberly**, whose appointment as freight traffic manager was announced in the *Railway Age* of July 25. **L. P. King**, assistant general freight agent, with headquarters at Charlotte, N. C., has been appointed assistant freight traffic manager, in charge of commission cases, with headquarters at Norfolk, succeeding Mr. Etheridge. Mr. King will in turn be replaced by **W. P. Hickey**. **F. H. Bryant**, assistant freight traffic manager, with headquarters at Jacksonville, Fla., has been transferred in the same capacity to Norfolk, Va. He will be succeeded by **J. P. Derham, Jr.** **W. M. Andrews**, assistant to freight traffic manager, and **J. C. Warren** have been appointed assistant general freight agents at Norfolk. The position formerly held by Mr. Andrews has been abolished. **B. J. King** has been appointed district freight agent with headquarters at Greenville, S. C., and **O. O. Walters** has been appointed district freight agent with headquarters at Jacksonville, Fla.

**W. D. Corfield**, whose appointment as assistant freight traffic manager of the Reading was noted in the *Railway Age* of July 25, entered the service of the Reading in 1884 as a waybill clerk. Two years later he became clerk and subsequently

was made assistant shipping clerk, rate clerk, chief clerk and freight solicitor. In



W. D. Corfield

1897 Mr. Corfield was appointed agent of the Blue Ridge Dispatch. In 1912 he became division freight agent and in 1927 was appointed general freight agent, the position he held until his recent appointment as assistant freight traffic manager, with headquarters at Philadelphia, Pa.

**Thomas M. Hayes**, assistant general manager of the Wabash, has been appointed assistant passenger traffic manager, with headquarters as before at St. Louis, Mo. Mr. Hayes was born at Morrisonville, Ill., and, after a public school and business college education, entered railway service in 1903 as a trackman on the Wabash. Two years later he became a clerk to a track supervisor, later being assigned to the position of stenographer in the division engineer's office. In 1909 Mr. Hayes was advanced to traveling secretary to the president, serving in this position until 1924, when he was made assistant to the presi-

general passenger agent, with headquarters at Chicago, to succeed **Morris R. Leahy**, who has retired, effective August 1, after 51 years' service with this company. Mr. Helmstadter was born on October 16, 1896, and entered the service of the North Western on September 1, 1920, as chief clerk in the traffic department at New York. Prior to going with the North Western Mr. Helmstadter had served for a short time with the Pennsylvania. On October 1, 1922, he was made city agent at New York for the North Western, and on March 1, 1929, he was advanced to traveling agent. On July 1 of the same year Mr. Helmstadter was further promoted to general agent at Cin-



George L. Helmstadter

cinnati, the position he was holding at the time of his recent appointment as general passenger agent at Chicago.

### ENGINEERING AND SIGNALING

**William C. Johnson**, general signal supervisor of the Chicago, St. Paul, Minneapolis & Omaha, has been promoted to superintendent telegraph and signals, effective July 27, with headquarters as before at St. Paul, Minn., succeeding **George Boyce**, deceased.

**T. Z. Krumm**, principal assistant engineer of the Minneapolis, St. Paul & Sault Ste. Marie, effective August 1, was appointed chief engineer of this company and of the Duluth, South Shore & Atlantic, with headquarters as before at Minneapolis, Minn. On both roads Mr. Krumm succeeds **E. A. Whitman**, promoted.

**Walter E. Heimerdinger**, who has been appointed district maintenance engineer of the Second district of the Chicago, Rock Island & Pacific, has been connected with the Rock Island for about 25 years. He was born on February 12, 1889, at Vulcan, Mich., and received his higher education at the University of Michigan, Ann Arbor. He entered the service of the Rock Island in September, 1911, and served successively at various points as an assistant on the engineering corps, inspector, instrumentman, roadmaster, assistant engineer, and office engineer. In 1922 he served as resident engineer on the con-



Thomas M. Hayes

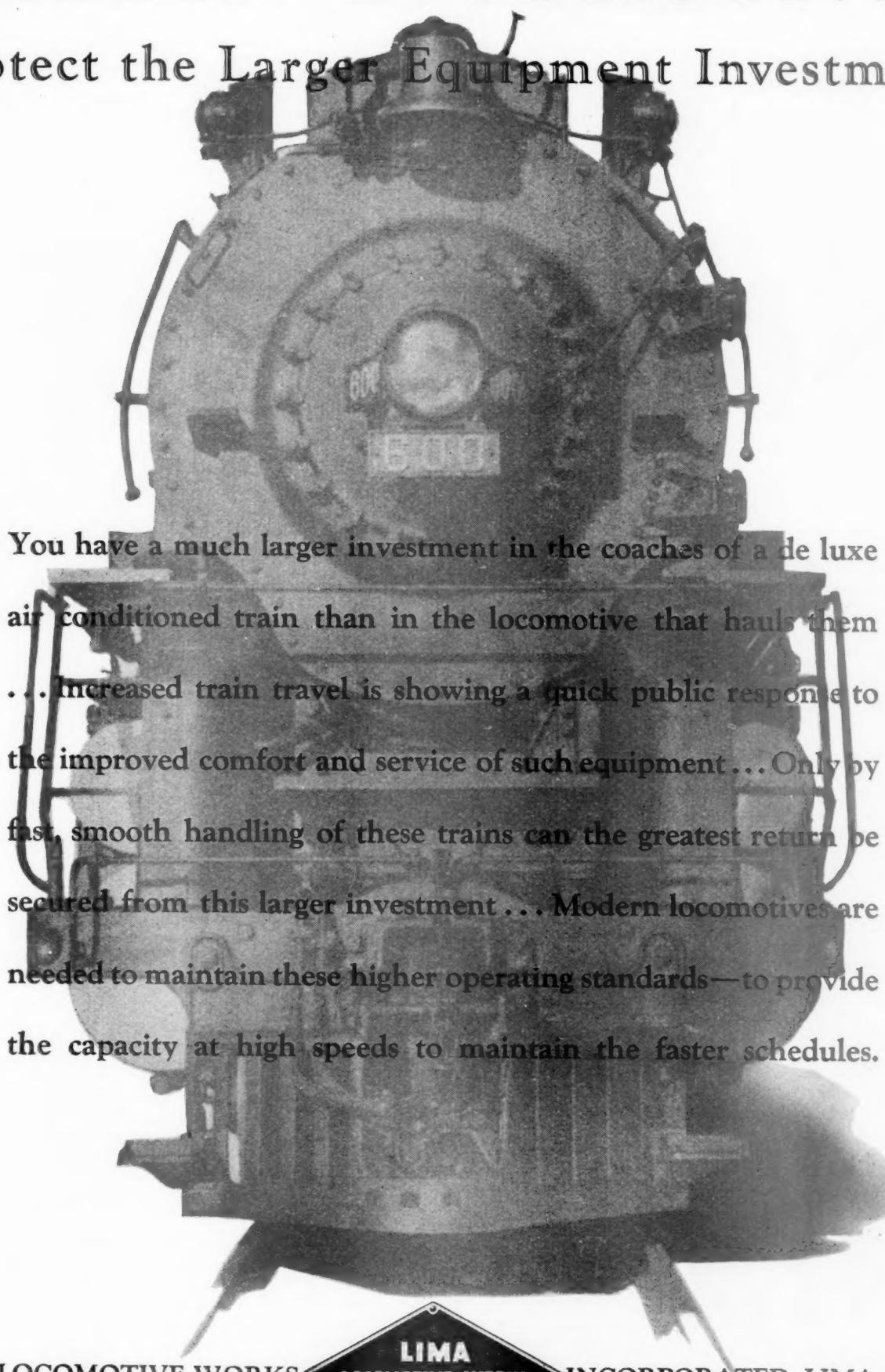
dent. In 1931, when the Wabash was placed in receivership, Mr. Hayes' title was changed to assistant to the receiver. Two years later he was appointed assistant general manager, which position he held until his recent promotion to assistant passenger traffic manager, which was effective on August 1.

**George L. Helmstadter**, general agent for the Chicago & North Western at Cincinnati, Ohio, has been appointed

*Continued on next left-hand page*

# MODERN LOCOMOTIVES

## Protect the Larger Equipment Investment



You have a much larger investment in the coaches of a de luxe air conditioned train than in the locomotive that hauls them . . . increased train travel is showing a quick public response to the improved comfort and service of such equipment . . . Only by fast, smooth handling of these trains can the greatest return be secured from this larger investment . . . Modern locomotives are needed to maintain these higher operating standards—to provide the capacity at high speeds to maintain the faster schedules.

LIMA LOCOMOTIVE WORKS



INCORPORATED, LIMA, OHIO

struction of the Rock Island terminals in Omaha, Neb., and in 1924 and 1925 he was the locating engineer in charge of surveying the line from Trenton, Mo., to Kansas City. Appointed division engineer on



Walter E. Heimerdinger

March 1, 1923, Mr. Heimerdinger has held that position at Des Moines, Iowa; Trenton, Mo., and Cedar Rapids, Iowa, being located at the latter point at the time of his recent appointment as district maintenance engineer of the Second district, with headquarters at Kansas City, Mo.

**William H. Hillis**, who has been appointed engineer maintenance of way of the Chicago, Rock Island & Pacific, with headquarters at Chicago, as announced in the *Railway Age* of July 11, was born at Colona, Ill., on March 31, 1886. At the time of his recent appointment Mr. Hillis had been in the service of the Chicago, Burlington & Quincy for more than 30 years. He first entered the service of that company as a rodman at Beardstown, Ill., on January 1, 1906, serving in various capacities in the engineering department until August 15, 1911, when he was appointed roadmaster. During the following five years he served in the latter position on various divisions, then being transferred to the operating department as trainmaster



William H. Hillis

on the Aurora division. In 1925 Mr. Hillis was appointed district engineer of maintenance of the Illinois district with

headquarters at Galesburg, Ill., and in October, 1927, he was advanced to assistant superintendent of the La Crosse division. Three years later he was transferred to the Galesburg division, and on December 15, 1931, he was sent to Texas where, as superintendent of construction, he had charge of the construction of a 110-mile line between Childress, Tex., and Pampa. Following the completion of this work Mr. Hillis returned to the La Crosse division as assistant superintendent, which position he was holding at the time of his recent appointment as engineer maintenance of way of the Rock Island.

**John L. Starkie**, who has been appointed district engineer of the Eastern district of the Eastern lines of the Atchison, Topeka & Santa Fe, as reported in the *Railway Age* of July 11, has been connected with the Santa Fe and affiliated lines for more than 30 years. He was born on October 27, 1883, at Worcester, Mass., and graduated from the University of Kansas in 1905. Immediately thereafter, Mr. Starkie entered railway service with the Kansas City, Mexico & Orient (now part of the Atchison, Topeka & Santa Fe), where he served as a chainman, rodman and instrumentman on the construction of new lines in Kansas, Okla-



John L. Starkie

homa, Texas and Mexico. In May, 1909, Mr. Starkie was promoted to resident engineer, in which capacity he divided his time between maintenance and construction work. In December, 1913, he left the Orient to become a draftsman on the Gulf, Colorado & Santa Fe at Galveston, where he was advanced to office engineer in April, 1914. During federal control of the railroads, Mr. Starkie served as office engineer until August, 1918, when he was appointed assistant chief engineer of Group VI of the Southwestern region, with headquarters at Dallas, Tex., returning to the position of office engineer on the G. C. & S. F. at Galveston in October, 1919. In July, 1924, he was appointed manager and operator of the railroad's ballast plant at Brownwood, Tex., which position he retained until 1930, when he was appointed division engineer at Temple, Tex. In 1931 Mr. Starkie returned to the position of office engineer at Galveston, where he remained until his recent appointment as district engineer at Topeka.

## MECHANICAL

**P. C. Withrow**, mechanical engineer of the Denver & Rio Grande Western, has been appointed acting general mechanical superintendent, with headquarters as before at Denver, Colo., succeeding W. J. O'Neill, whose appointment as superintendent motive power of the Western Pacific was reported in the *Railway Age* of June 20.

**Laurence C. Bowes**, general piece work supervisor of the Chicago, Rock Island & Pacific, has been promoted to the



Laurence C. Bowes

newly created position of engineer of shop plants and machinery, with headquarters as before at Chicago. Mr. Bowes was born on June 23, 1890, at Minneapolis, Minn., and received his higher education at Cornell university. He entered the service of the Rock Island in July, 1916, as inspector of stationary boiler plants, serving in this capacity until December, 1922, except for a period during the World War when he was in military service, serving as a private and sergeant overseas. At the end of this period he was promoted to production engineer, and on July 1, 1926, he was advanced to general piece work supervisor, the position he was holding at the time of his recent appointment.

## SPECIAL

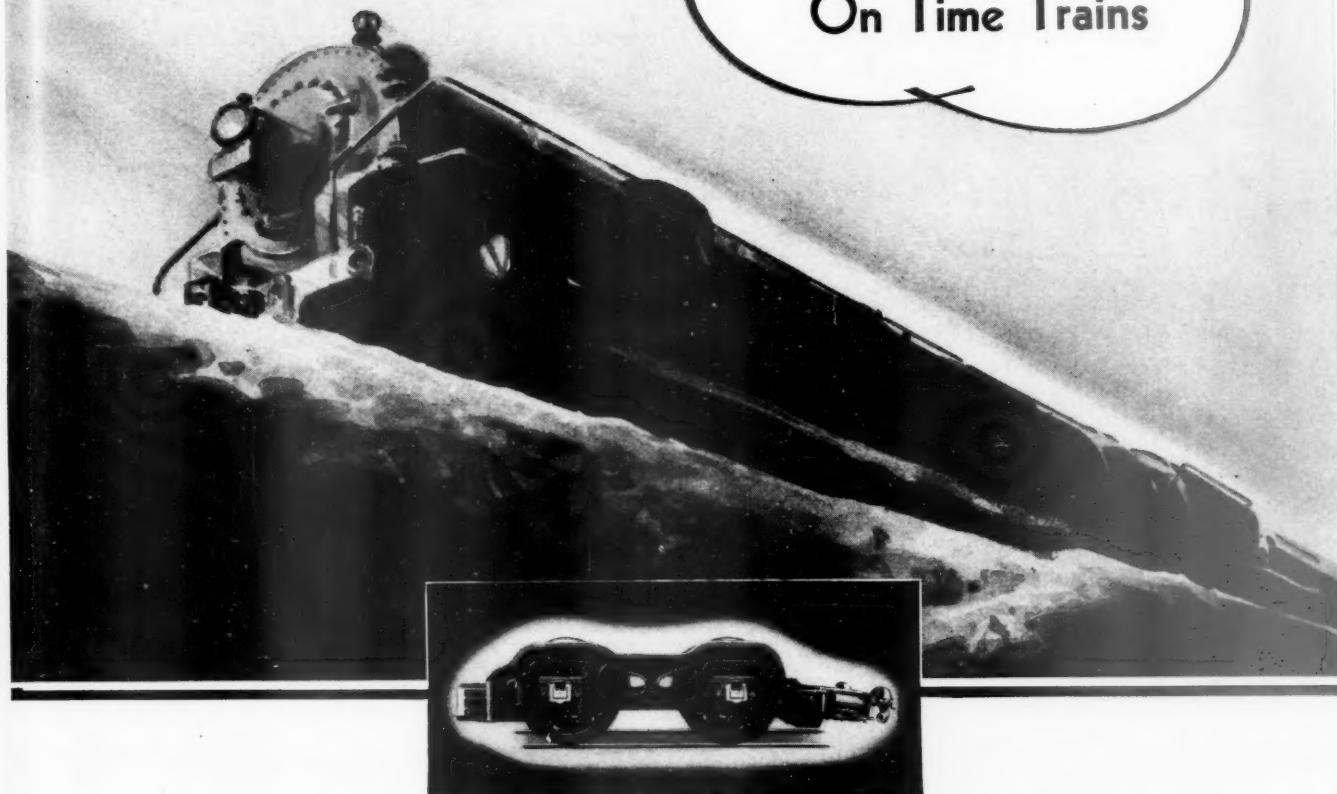
**R. W. Jennings**, assistant advertising manager of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been promoted to advertising manager to succeed **Herbert F. McLaury**, who has been placed in charge of advertising for the Association of American Railroads.

## OBITUARY

**Horace J. Clark**, retired district superintendent of the Pullman Company in Houston, New Orleans and Detroit, died at Springfield, Mass., on August 2, a month after his retirement.

**Charles R. Capps**, who retired as chief traffic officer of the Seaboard Air Line on July 16 because of ill health, died at his home in Norfolk, Va., on July 31. Mr. Capps was 65 years of age.

"AirConditioned Trains"  
must be  
"On Time Trains"



## Or the Investment is Impaired

Air conditioning increases the power demand on the locomotive. It is equivalent to adding one or more cars to the train.

To maintain operating standards, extra power is needed for starting, for accelerating and to get out of "tight places."

The Locomotive Booster provides this added power instantly when needed—

power that insures smooth operation, avoids loss of time in starting and safeguards schedules.

Its application means economical operation and more satisfied passengers in your de luxe equipment.

Without The Booster, air conditioned and other trains are under an operating handicap.



The close tolerances essential to efficient Booster operation call for genuine repair parts made by Franklin.

# FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK

CHICAGO

MONTREAL

## Revenues and Expenses of Railways

MONTH OR JUNE AND SIX MONTHS OF CALENDAR YEAR 1936

Av. mileage operated during period	Operating revenues						Operating expenses						Net railway operating income						Before depr. & ret. 1935				
	Freight			Passenger (inc. misc.)			Way and structures			Maintenance of Equipment			Transportation			Total			Operating ratio				
	Freight	Passenger	Total	Passenger	Freight	Total	Traffic	Structures	Equipment	Traffic	Structures	Equipment	Transportation	Passenger	Freight	Total	Passenger	Freight	Total	Passenger	Freight	Total	
Akron, Canton & Youngstown.....June	171	\$172,996	\$19	\$179,845	\$16,340	\$9,073	\$52,334	\$119,574	\$66.5	\$60,771	\$47,447	\$14,151	\$27,447	\$1,451	\$31,951	\$27,447	\$1,451	\$31,951	\$27,447	\$1,451	\$31,951		
Alton .....	171	1,073,571	247	1,107,159	1,146	50,160	50,160	62.7	410,902	339,604	226,233	189,448	226,233	189,448	226,233	189,448	226,233	189,448	226,233	189,448	226,233		
Atlanta & West Point.....June	956	5,522,100	956	5,522,232	752,237	1,326,965	267,531	200,906	52,777	3,026,856	6,029,099	80.1	1,496,148	975,939	40,113	—40,113	—526,157	130,184	—526,157	130,184	—526,157	130,184	—526,157
Achison, Topeka & Santa Fe System.....June	1,431,393	13,297,005	1,244,489	2,986,943	463,126	4,468,418	10,497,840	78.9	9,955,256	1,687,976	1,558,817	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359		
Atlanta, Birmingham & West Point.....June	573,517	10,793,000	561,233	69,486,833	1,183,206	17,53,496	1,183,131	30,466	7,895	25,983	59,3,597	59,3,597	14,439	14,439	14,439	14,439	14,439	14,439	14,439	14,439	14,439	14,439	
Western of Alabama.....June	133	85,815	85,815	22,676	122,718	31,913	48,263	111,858	91.2	10,860	10,860	10,860	2,239	2,239	4,043	4,043	4,043	18,569	18,569	13,428	13,428		
Charleston & Western Carolina.....June	639	192,523	192,523	132,452	741,873	184,471	20,905	100,246	94.4	41,637	41,637	41,637	2,119	2,119	62,439	62,439	62,439	80,770	80,770	80,770	80,770		
Staten Island Rapid Transit.....June	93	1,285,992	1,285,992	8,381	228,407	45,584	50,196	238,846	104.6	—10,384	—10,384	—10,384	—23,119	—23,119	—23,119	—23,119	—23,119	—21,676	—21,676	—21,676	—21,676		
Atlantic Coast Line.....June	5,144	2,485,207	342,112	3,155,544	2,380,222	69,1,602	122,799	1,298,918	83.3	5,863,413	5,863,413	5,863,413	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359			
Baltimore & Ohio.....June	342	16,300,208	4,206,712	23,31,558	2,477,808	4,12,779	29,149	6,494	56,224	12,57,716	12,57,716	12,57,716	72.4	72.4	28,168	28,168	28,168	15,808	15,808	15,808	15,808		
Bangor & Aroostook.....June	281,009	1,056,632	6,909	1,092,464	156,244	168,830	38,283	361,405	754,574	69.1	337,890	337,890	337,890	229,890	229,890	211,195	211,195	211,195	248,915	248,915	248,915		
Baltimore & Ohio.....June	603	10,56,299	10,56,299	1,43,34,265	1,55,402	3,213,562	4,39,484	4,56,49,982	10,48,513	73.1	3,849,752	3,849,752	3,849,752	2,962,025	2,962,025	2,477,809	2,477,809	2,477,809	3,094,398	3,094,398	3,094,398		
Staten Island Rapid Transit.....June	225	3,15,360	3,15,360	5,23,58,828	6,92,699	19,03,1,346	2,29,025	2,29,025	27,89,926	60,15,857	70.9	19,306,169	19,306,169	19,306,169	14,39,978	14,39,978	12,11,629	12,11,629	12,11,629	226,834	226,834	226,834	
Boston & Maine.....June	1,988	2,718,851	588,185	3,841,060	4,984,398	1,649,925	716,167	1,649,925	1,649,925	68,635	1,013,805	3,679,144	66.1	1,888,334	1,888,334	1,426,348	1,426,348	1,426,348	1,737,359	1,737,359	1,737,359		
Baltimore-Rock Island.....June	255	1,995	15,994,022	3,202,378	22,15,377	4,984,398	3,86,424	35,406	1,44,755	2,89,285	75.3	3,941,967	3,941,967	3,941,967	661,146	661,146	492,730	492,730	492,730	24,695	24,695	24,695	
Baltimore & Ohio.....June	85	10,75	10,75	617,040	543,801	21,299	55,67,478	716,167	1,649,925	68,635	1,013,805	3,679,144	66.1	1,27,744	1,27,744	929,845	929,845	929,845	1,737,359	1,737,359	1,737,359		
Boston & Maine.....June	233	91,587	91,587	14,352	61,597	2,216	2,50,826	260,279	27,364	3,987	32,265	34,591	122,3	62,8	62,8	1,21,120	1,21,120	1,21,120	—46,147	—46,147	—46,147		
Brooklyn Eastern District Terminal.....June	37	3,20,662	3,20,662	86,502	9,37,9	86,667	9,548	38,844	371	20,346	6,739	6,739	45,237	117,6	117,6	110,398	110,398	110,398	149,044	149,044	149,044		
Canadian Pacific Lines in Maine.....June	37	584,730	584,730	86,690	45,849	389,701	124,993	168,488	257,10	2,271	75,563	54,916	93,38	38,774	38,774	328,187	328,187	328,187	2,78,607	2,78,607	2,78,607		
Burlington-Rock Island.....June	255	51,641	46,683	27,457	386,132	90,785	74,663	23,265	45,280	117,6	20,346	11,36,273	18,26,410	85.0	52,616	52,616	49,730	49,730	49,730	629,481	629,481	629,481	
Canadian Pacific Lines in Vermont.....June	85	60,479	60,479	81,334	11,60,722	17,677	30,753	11,60,722	17,677	30,753	11,60,722	17,677	11,60,722	11,60,722	11,60,722	11,60,722	11,60,722	11,60,722	11,60,722	11,60,722	11,60,722		
Central of Georgia.....June	233	1,097,587	1,097,587	82,216	1,25,040	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	119,106	119,106	110,598	110,598	110,598	—57,304	—57,304	—57,304	
Central of New Jersey.....June	85	3,79,672	44,007	487,614	124,993	168,488	257,10	2,271	75,563	54,916	93,38	31,585	31,585	31,585	31,585	31,585	31,585	31,585	31,585	31,585	31,585		
Central of New Jersey.....June	453	1,005,071	1,005,071	106,565	1,22,9,809	161,178	1,280,430	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central of New Jersey.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	1,737,359	
Central Vermont.....June	3,106	2,470,030	33,104	494,587	1,27,576	1,64,965	1,64,965	1,64,965	1,64,965	52,167	1,06,246	1,42,432	1,55,075	86.6	1,243,620	1,243,620	1,737,359	1,					

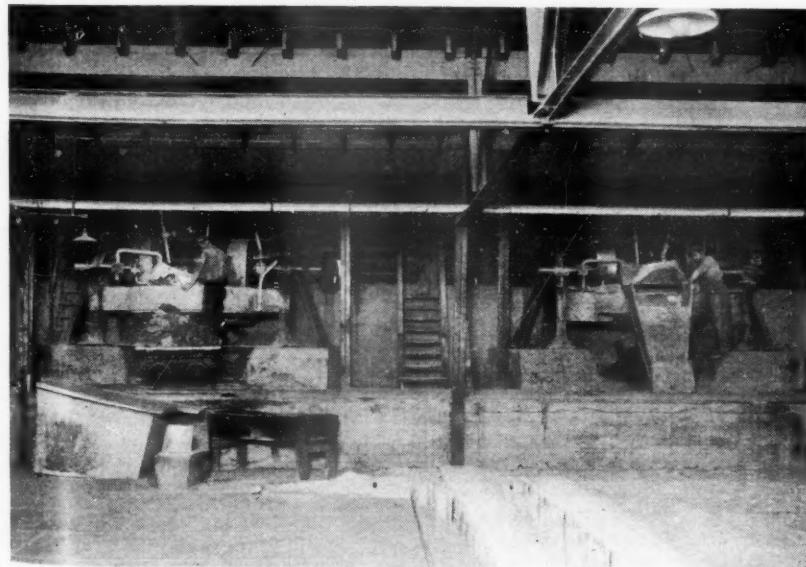
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NO. 2 OF A SERIES ON THE MANUFACTURE OF SECURITY ARCH BRICK

## CAREFUL CLAY PROPORTIONING AND THOROUGH MIXING AND GRINDING

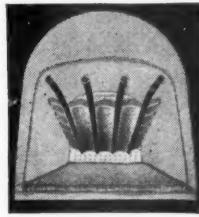


*The several kinds of clay used in Security Arch Brick are transported by rail from distant points to the brick plant. It is dumped in separate bins to permit accurate proportioning for maximum brick service life.*



*There's more to Security Arches than just brick*

**HARBISON-WALKER  
REFRACTORIES CO.**  
**Refractory Specialists**



**AMERICAN ARCH CO.  
INCORPORATED**

**Locomotive Combustion  
Specialists** » » »

**makes  
uniform  
Long Life Brick**

**Security Arch Brick render consistently long service in the firebox.**

**One of the reasons for this is the careful clay selection. This clay must be transported by rail from deposits in many cases considerable distances from the plant. Next is thorough mixing and grinding to provide uniform brick structure and uniform brick.**

**As in alloy steel, this uniform structure means uniform strength and dependable service.**

**It is a big factor in the long mileage and low cost service the Security Arch delivers in the firebox.**

1,711,049 1,192,396 445,250 4,934,794 298,651 4,082,931 572 6 mos.

## Revenues and Expenses of Railways

MONTH OF JUNE AND SIX MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road	Av. mileage operated during period	Operating expenses						Net from railway operation	Operating ratio	Operating income	Net railway operating income				
		Maintenance of Equipment		Way and Equipment		Transporta- tion					After depr. & retir. —				
		Passenger (inc. misc.)	Total	structures	traffic	Equip.	Total	Total	1935	1936	1935	1936	Before depr. & ret.		
Chicago, Milwaukee, St. Paul & Pacific	June 1, 1936	\$676,028	\$9,162,489	\$2,295,334	\$1,629,659	\$230,489	\$3,137,669	\$7,622,070	83.2	\$798,292	\$216,788	\$1,026,467	\$763,870		
Chicago, Milwaukee, St. Paul & Pacific	June 6 mos.	42,329,712	3,226,859	891,300	8,374,339	9,784,885	1,227,011	19,835,315	41,177,929	81.9	9,080,733	2,123,177	1,03,604	4,811,895	
Chicago, Rock Island & Pacific	June 5, 122,219	5,122,219	567,095	6,320,342	9,780,805	1,523,743	211,306	5,557,123	87.9	763,219	280,076	577,727	351,102		
Chicago, Rock Island & Gulf	June 7, 574	27,806,931	3,303,383	14,654,169	4,516,001	8,728,070	1,168,994	15,357,126	32,116,816	92.7	2,537,353	—227,156	—1,925,958	—1,659,907	
Chicago, Rock Island & Gulf	June 6 mos.	626	1,429,493	161,904	2,045,343	62,938	28,788	16,038	69.4	116,179	92,031	8,703	43,600		
Chicago, St. Paul, Minneapolis & Omaha	June 1, 648	1,369,791	145,952	1,631,274	190,000	255,054	37,436	763,441	75.3	506,188	84,200	108,624	108,624		
Chicago, St. Paul, Minneapolis & Omaha	June 6 mos.	1,648	7,095,394	725,018	8,422,905	1,028,168	1,507,232	206,994	74,28,310	7,466,957	390,734	—229,725	69,153		
Clinchfield Railroad	June 1, 129	42,936,138	24,615	2,993,326	236,736	683,233	104,732	1,755,339	62.2	163,608	111,907	123,080	200,468		
Clinchfield Railroad	June 6 mos.	1,021	2,510,990	35,173	597,356	98,428	110,495	123,365	73.8	1,277,947	1,012,537	1,224,998	1,486,541		
Colorado & Southern	June 1, 921	2,662,966	161,379	3,234,438	393,414	667,347	77,033	1,349,843	88.3	541,440	166,441	—4,147	—65,696		
Colorado & Southern	June 6 mos.	167	456,971	34,555	522,399	17,844	22,278	210,551	92.5	39,70	19,002	11,692	28,457		
Fort Worth & Denver City	June 1, 902	2,466,241	42,980	4,493	4,316	2,045,343	246,637	86,601	74.3	116,417	81,055	52,922	—4,005		
Fort Worth & Denver City	June 6 mos.	167	2,466,241	231,756	55,613	93,349	104,752	601,452	73.5	714,795	516,422	341,402	447,543		
Columbus & Greenville	June 1, 902	2,466,241	52,547	135,368	12,318,558	1,649,836	287,208	906,280	1,985,8	9,813	8,311	—4,739	11,106		
Columbus & Greenville	June 6 mos.	167	456,971	34,555	522,399	17,844	22,278	210,551	92.5	39,70	19,002	11,692	28,457		
Delaware & Hudson	June 1, 830	1,876,965	72,570	2,039,076	496,068	496,068	97,018	1,755,339	72.2	354,474	210,634	218,295	275,983		
Delaware, Lackawanna & Western	June 1, 984	3,055,997	512,420	12,318,558	1,649,836	3,001,395	274,376	6,692,014	10,42,338	84.7	1,886,240	1,096,793	1,159,086	1,237,851	
Denver & Rio Grande Western	June 1, 584	9,766,259	620,074	10,940,387	3,296,135	52,683	287,208	906,280	1,985,8	9,813	8,311	—4,739	11,106		
Denver & Salt Lake	June 1, 232	12,44	52,547	135,368	12,318,558	1,649,836	287,208	906,280	1,985,8	9,813	8,311	—4,739	11,106		
Detroit & Mackinac	June 1, 242	57,223	2,608	67,026	15,559	11,284	962	22,067	79.2	13,952	11,412	8,124	—1,218		
Detroit & Toledo Shore Line	June 1, 242	25,720	16,414	305,225	57,884	63,881	55,150	13,533	51.5	2,154,647	1,783,238	1,722,696	1,916,787		
Detroit, Toledo & Ironton	June 1, 472	3,993,988	1,457	4,088,222	362,823	499,652	10,767	123,969	50.5	1,938,669	1,096,700	1,098,200	1,098,200		
Duluth, Missabe & Northern	June 1, 558	2,333,650	1,701	4,642,857	217,525	3,738	37,239	805,579	61.5	1,958,669	1,096,700	1,098,200	1,098,200		
Duluth, Missabe & Northern	June 6 mos.	50	2,70,162	271,442	37,779	29,30	77,85	68,194	55.6	1,20,44	961,637	613,123	544,397		
Detroit, Toledo & Ironton	June 1, 472	422	3,993,988	1,457	4,088,222	362,823	499,652	10,767	123,969	50.5	2,154,647	1,783,238	1,722,696	1,916,787	
Duluth, Missabe & Northern	June 6 mos.	50	2,70,162	271,442	37,779	29,30	77,85	68,194	55.6	1,20,44	961,637	613,123	544,397		
Duluth, Winnipeg & Pacific	June 1, 178	100,881	1,621	105,568	136,475	11,644	10,867	38,923	94.5	5,762	7,255,157	—17,093	—30,507		
Elgin, Joliet & Eastern	June 1, 434	1,237,356	11,390	685,956	152,821	344,781	13,916	54,92,957	1,102,386	73.1	404,939	296,675	252,155	249,573	
Erie	June 1, 297	5,994,597	441,246	1,70,403	673,206	1,318,90	1,71,895	1,24,92,934	4,897,976	69.7	2,126,087	1,631,555	1,65,092	188,501	
New Jersey & New York	June 1, 45	3,388,190	2,529,418	39,929,338	3,404,092	766,139	1,01,166	14,864,293	28,63,138	71.8	11,271,205	8,677,205	1,948,836	1,629,542	
Florida East Coast	June 1, 712	294,677	83,320	48,536	69,084	5,950	507	47,754	70,039	104.3	—8,242	—8,242	82,347	1,670,539	
New York, Susquehanna & Western	June 1, 215	220,304	24,357	1,756,160	30,251	34,566	4,844	28,589	70,802	1,26,849	171,161	247,778	—14,021		
Georgia Railroad	June 1, 329	1,557,873	144,057	1,757,725	1,737,381	157,353	20,316	16,22,132	44,69,900	104.6	—19,575	—24,955	—20,894	—5,737	
Georgia & Florida	June 1, 408	492,239	12,629	96,427	125,752	99,646	8,359	36,274	97,3	5,762	121,161	125,155	128,894	126,894	
Grand Trunk Western	June 1, 032	1,89,762	77,189	121,607	126,606	301,848	2,238,509	210,825	4,727,126	9,067,949	73.7	3,235,819	2,607,858	2,215,521	2,030,859
Canadian Nat'l Lines in New Eng.	June 1, 172	581,916	5,034	97,600	48,560	18,511	5,661	113,780	52,232	99.7	1,190,768	1,349,811	1,190,768	1,672,497	
Great Northern	June 1, 238	5,162,40	2,458,890	63,885	245,911	1,08,302	1,08,302	1,08,302	1,08,302	1,08,302	7,255,157	7,255,157	9,181,951	9,181,951	

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# The Superheater

Each of the following features is being discussed in this series of advertisements.

**Maximum Ton Miles per  
Hour**

- Boiler Capacity and Tractive Effort
- Heating Surface and Boiler Capacity
- Heating Surface and Boiler Efficiency
- Minimum Draft Loss and Low Back Pressure
- High Sustained Superheat
- Higher Superheat and Minimum Steam Consumption
- Greater Sustained Capacity
- Reduced Fuel and Water Consumption per Unit of Work Done
- Total Fuel Consumption of American Railroads
- Reduced Cost of Locomotive Horsepower

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For High Efficiencies Use Elesco Type "E" Superheaters

# AS A FACTOR IN LOCOMOTIVE DESIGN



# *High Superheat and Minimum Steam Consumption*

Low steam consumption per horsepower depends largely upon high sustained superheat.

With superheaters developing 200 deg. F. of superheat, there is a saving of 35% in steam per horsepower hour as compared with saturated steam. With the type "E" superheater, superheat of 350 deg. F. is possible at high rating and without sacrifice of evaporative capacity, producing a further saving of 15%.

The steam consumption per i.h.p.-hr. obtained on a test with a modern high-speed freight locomotive, operating at 50% cutoff, showed the following results:

<u>STEAM TEMPERATURE</u>	<u>STEAM PER 1.HP-HR.</u>	<u>SAVING IN STEAM From the Use of Superheat</u>
Saturated Steam	28 lb.	—
150° Superheat	21 lb.	25.0%
200° Superheat	18 lb.	35.6%
250° Superheat	16 lb.	43.0%
350° Superheat	14 lb.	50.0%

# THE SUPERHEATER COMPANY

Representative of American Throttle Company, Inc.

60 East 42nd Street  
NEW YORK



Peoples Gas Building  
CHICAGO

Canada: The Superheater Company, Limited, Montreal

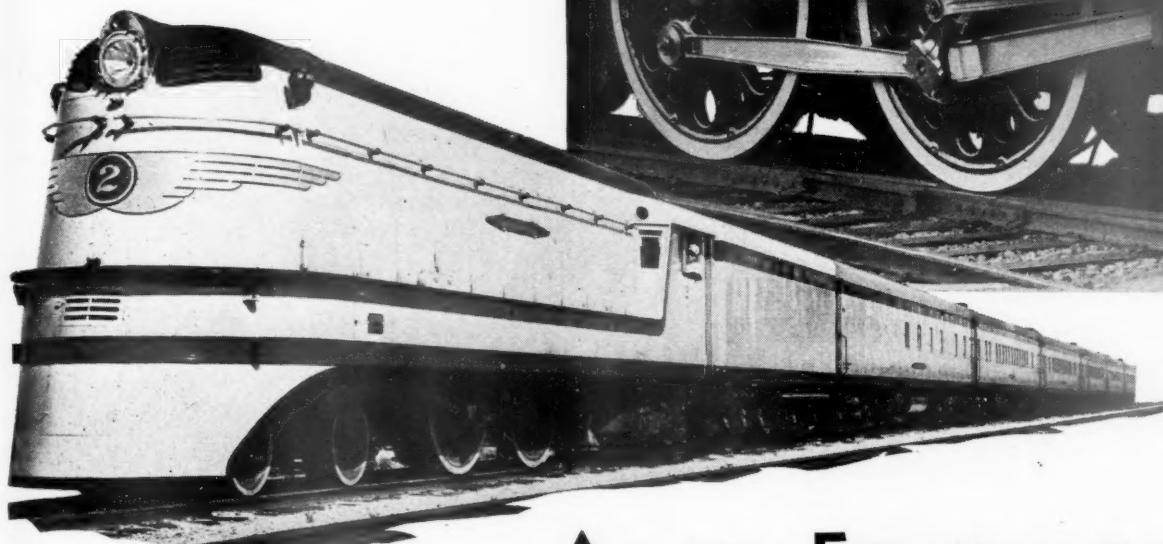
## Revenues and Expenses of Railways

MONTH OF JUNE AND SIX MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Net from railway operation	Operating income	Net railway operating income	
		Freight	Passenger (inc. misc.)	Way and Equipment structures	Traffic	Transportation	Total				
Green Bay & Western.....	June 6 mos.	234	\$900	\$140,946	\$36,658	\$12,175	\$5,958	\$104,665	\$36,381	\$15,558	
Gulf & Ship Island.....	June 6 mos.	234	4,626	780,207	169,541	94,647	35,229	809,836	186,957	\$7,980	
Gulf, Mobile & Northern.....	June 6 mos.	259	78,184	9,909	92,707	15,803	3,265	56,404	76,1	\$7,101	
Illinois Central.....	June 6 mos.	936	592,562	48,372	719,922	106,813	88,065	20,356	355,350	12,582	
Yazoo & Mississippi Valley.....	June 6 mos.	1,619	1,093,421	76,407	1,238,883	105,305	192,536	32,136	841,250	61,120	
Illinois Central System.....	June 6 mos.	6,592	44,483,566	4,721,555	53,667,644	4,776,588	11,543,370	1,572,853	20,922,175	41,589,537	77,5
Illinois Terminal.....	June 6 mos.	508	380,800	63,597	484,527	62,447	67,275	150,219	316,006	65,22	
Kansas City Southern.....	June 6 mos.	514	2,284,620	412,408	2,197,285	2,174,999	106,223	49,205	315,351	63,69	
Kansas, Oklahoma & Gulf.....	June 6 mos.	160	373,585	91	427,804	35,972	19,703	120,873	4,945,945	71,9	
Lake Superior & Ishpeming.....	June 6 mos.	160	818,865	561	926,513	153,901	169,283	3,406	52,311	59,6	
Lehigh & Hudson River.....	June 6 mos.	96	126,955	101	127,650	18,844	21,996	3,667	44,275	55,615	
Lehigh & New England.....	June 6 mos.	218	770,386	662	785,283	88,370	121,829	21,485	285,035	75,640	
Louisiana & Arkansas.....	June 6 mos.	219	1,980,161	263	306,765	36,568	78,511	6,245	120,650	25,405	
Louisiana Valley.....	June 6 mos.	1,331	3,635,029	198,758	4,118,147	1,251,953	695,298	668,999	10,394,094	10,797,307	
Louisiana, Arkansas & Texas.....	June 6 mos.	255	595,872	1,218	623,269	62,476	4,160,364	27,336	113,063	284,807	
Louisville & Nashville.....	June 6 mos.	4,999	6,264,692	528,441	7,243,601	1,623,934	64,500	62,154	556,440	57,133	
Maine Central.....	June 6 mos.	1,046	717,675	93,943	897,408	1,05,072	11,089	4,740	192,973	1,045,687	
Midland Valley.....	June 6 mos.	351	5,016,724	426,913	1,01,358	1,21,552	1,081,192	67,101	2,30,386	59,1	
Minneapolis & St. Louis.....	June 6 mos.	1,579	809,318	10,390	851,774	171,012	163,400	15,429	749,519	83,5	
Minneapolis, St. Paul & S. S. Marie.....	June 6 mos.	1,602	3,923,682	69,155	4,202,888	512,385	727,247	21,795	4,84,840	80,574	
Duluth, South Shore & Atlantic.....	June 6 mos.	550	1,160,247	62,526	1,333,308	181,527	209,892	4,344	501,730	71,0	
Spokane International.....	June 6 mos.	163	64,182	1,318	71,455	18,907	5,759	1,735	20,437	385,182	
Mississippi Central.....	June 6 mos.	150	408,304	7,390	65,303	68,167	11,987	20,357	50,762	71,0	
Missouri-Arkansas.....	June 6 mos.	364	27,198	1,215	84,003	9,857	4,352	41,098	1,165,503	10,315	
Missouri-Illinois.....	June 6 mos.	364	451,324	6,998	494,329	109,018	60,301	26,414	168,215	30,257	
Missouri-Kansas-Texas Lines.....	June 6 mos.	208	100,595	603	102,856	33,866	36,899	4,344	501,730	71,1	
Missouri Pacific.....	June 6 mos.	7,228	6,110,578	423,285	7,138,656	1,077,081	9,518	69,329	30,762	33,527	
Gulf Coast Lines.....	June 6 mos.	7,228	35,653,229	2,428,025	41,421,556	5,485,541	1,415,535	1,207,652	15,393,728	17,086	

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# WHEN HIAWATHA Hits 100 m.p.h.



## ALCO FORGINGS PROTECT THE SERVICE

**ALCO**

WORKING in close coordination with modern smithy shop equipment and laboratory facilities of every necessary kind, ALCO craftsmen and ALCO scientists maintain ALCO quality throughout all phases of forging fabrication.

Made from flawless, selected material of unvarying perfection — and accuracy-tested to fixed standards — ALCO Forgings fully comply with every railway requirement — safety — efficiency — economy.

That is why the dependability of ALCO main rods, side rods, crank pins, axles and other ALCO forgings on the Hiawatha, is assured at speeds of 100 m.p.h. and over.

— and why ALCO Forgings play such an important part in protecting modern, high-speed service on many railroads.

AMERICAN LOCOMOTIVE COMPANY  
**ALCO FORGINGS**  
 30 CHURCH STREET · NEW YORK · N.Y.

## Revenues and Expenses of Railways

MONTH OF JUNE AND SIX MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Net from railway operation	Operating income	Net railway operating income				
		Freight	Passenger (inc. misc.)	Total	Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	After depr. & retr.			
International Great Northern.....	June 6 mos.	\$785,780	\$79,274	\$963,744	\$144,723	\$196,351	\$29,715	\$412,290	\$837,200	86.87	\$15,461	\$31,021		
Mobile & Ohio.....	June 6 mos.	1,154	4,828,576	3,277,050	5,787,032	845,438	1,166,498	1,291,107	2,415,184	9,332,937	85.24	84,095	29,937	
Monongahela.....	June 6 mos.	1,201	4,883,921	28,128	846,155	107,049	1,084,666	38,051	297,920	818,156	155,850	103,745		
Monon.....	June 6 mos.	57	1,194,651	101	4,908,990	618,046	1,029,064	24,628	1,839,564	4,035,695	82.2	873,955	59,276	
Nashville, Chattanooga & St. Louis.....	June 6 mos.	1,154	5,362,159	539,884	1,100,467	171,982	330,178	38,329	25,988	137,867	41.8	192,311	93,447	
Nevada Northern.....	June 6 mos.	165	37,663	380	42,554	867,144	1,009,537	2,303,802	176,670	488,898	39.1	1,492,438	1,271,532	
New York Central.....	June 6 mos.	1,154	9,007,135	29,566,066	122,787,510	1,161,006	16,844,610	3,336,686	55,597	423,660	1,014,683	73.1	7,954,998	5,765,242
Pittsburgh & Lake Erie.....	June 6 mos.	233	9,007,135	58,237	1,767,455	1,878,890	2,086,742	370,944	2,690,106	6,317,531	63.4	41,191,177	28,397,545	
New York, Chicago & St. Louis.....	June 6 mos.	1,704	18,503,143	83,630	3,337,425	1,110,467	301,272	38,329	25,988	7,780	92.2	723,480	451,017	
New York, New Haven & Hartford.....	June 6 mos.	1,704	2,053	1,891,582	1,891,824	6,295,193	829,741	836	1,392,586	2,983,301	56.8	12,332	181,964	
New York Connecting.....	June 6 mos.	20	1,325,461	30,941	1,396,488	83,630	306,172	17,014	4,263	1,049,078	2,144,711	63.4	1,192,714	937,927
New York, Ontario & Western.....	June 6 mos.	566	6,003,423	76,125	4,399,936	439,669	64,225	44,314	10,401,111	21,631,543	22.9	1,076,830	868,380	
Norfolk & Western.....	June 6 mos.	2,166	7,231,344	188,576	7,647,836	1,033,944	1,114,327	131,635	1,544,100	4,002,454	52.3	3,645,382	2,348,202	
Norfolk Southern.....	June 6 mos.	2,166	40,459,896	979,713	42,807,089	5,055,484	6,655,525	729,741	70,186	1,890,277	3,387,888	73.9	19,407,184	13,616,617
Northern Pacific.....	June 6 mos.	132	4,257,263	440,667	4,955,972	3,761,324	1,061,971	182,354	9,685,847	23,399,905	54.7	12,686,890	9,603,754	
Pennsylvania.....	June 6 mos.	351	1,066,225	52,240	1,804,689	26,204,994	3,416,319	6,375,557	135,763	6,313,005	48.8	2,741,826	1,476,655	
Oklahoma City-Ada-Atoka.....	June 6 mos.	103	25,389,177	88,765	321,995	40,220	50,284	53,310	151,768	21,768	89.5	10,377,932	7,559,531	
Pittsburgh & Shawmut.....	June 6 mos.	103	2,072,099	38,693	2,209,195	402,162	298,495	134,497	826,978	1,722,659	80.7	4,265,336	255,347	
Long Island.....	June 6 mos.	132	39,518	490	42,410	6,071	2,333	664	11,625	23,156	54.6	19,254	253,721	
Pennsylvania-Reading Seashore Lines.....	June 6 mos.	412	21,389,166	5,252,678	27,389,166	3,341,826	3,986	4,358	1,778,105	21,631,543	77.2	1,371,875	125,217	
Pere Marquette.....	June 6 mos.	2,115	2,351,039	397,797	15,765,758	1,701,632	3,248,088	3,173,106	21,757	12,686,890	73.7	4,142,503	2,348,202	
Pittsburgh & West Virginia.....	June 6 mos.	396	527,851	1,613,182	2,244,406	154,859	373,262	21,947	9,319,924	1,552,090	69.2	69,086	352,619	
Pittsburgh, Shawmut & Northern.....	June 6 mos.	190	14,600,832	294,968,166	32,637,644	1,653,079	2,425,279	42,210,613	3,710,529	10,236,500	9,369,935	77.2	2,685,630	1,371,875
Reading.....	June 6 mos.	103	258,372	2,199	30,036	2,122	9,962	15,152,99	1,222	11,917	41,245	137.3	10,236,500	1,371,875
Pittsburgh & West Virginia.....	June 6 mos.	138	1,709,678	2,317,576	38,311	419,478	99,095	1,197,806	60,444	21,757	68.0	10,158,228	1,371,875	
Pittsburgh, Shawmut & Northern.....	June 6 mos.	190	493,731	327	502,632	24,900	1,243	28,403	77,469	1,231	12,686,890	10,236,500		
Reading.....	June 6 mos.	138	1,709,678	2,317,576	38,311	419,478	99,095	1,197,806	60,444	21,757	68.0	10,158,228	1,371,875	
Pittsburgh, Potomac & Frederickburg.....	June 6 mos.	117	2,456	25,847,973	29,098,960	2,333,541	5,022,888	448,035	11,769,028	20,260,038	66.1	1,455,614	1,129,932	
Pittsburgh, Shawmut & Northern.....	June 6 mos.	117	3,333,615	325,437	1,709,678	2,24	66,451	112,598	226,147	42,943	77.6	6,610,112	4,016,041	
Rutland.....	June 6 mos.	407	1,116,990	174,803	295,261	419,939	52,593	11,222	1,231,947	25,357,457	76.0	4,146	27,571	
St. Louis, San Francisco, etc.....	June 6 mos.	4,928	18,455,083	1,507,707	21,947,385	3,253,902	5,415,440	674,416	62,288	839,951	84.8	3,329,098	1,605,106	

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E. L. Lewis

San Francisco

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## CARRY IT *into the Cab!*

Regardless of weather conditions, engineers have a **continuous** signal indication, that cannot be hidden by fog or storm, if locomotives are equipped with "Union" Coded Continuous Cab Signals. It is the signal that rides in the cab and **instantly** advises engineers of any change in track conditions ahead. » » » »

Safety of operation is increased, traffic is expedited and operating cost is reduced. » » » » » » » » »

Ask our nearest district office for details. » » » » »



### Union Switch & Signal Co.

SWISSVALE, PA.

1110 NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

## Revenues and Expenses of Railways

MONTH OF JUNE AND SIX MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Net from railway operation	Operating income	Before depr. & ret.	
		Freight	Passenger (inc. misc.)	Total	Way and structures	Equipment	Traffic	Transporta- tion	Total		
Fort Worth & Rio Grande.....	June 6 mos.	\$1,031	\$1,658	\$13,002	\$1,907	\$21,470	\$47,316	103.6	\$1,658	\$13,178	
St. Louis, San Francisco & Texas.....	June 6 mos.	18,515	4,485	233,620	87,486	140,484	307,555	131.9	74,305	143,934	
St. Louis Southwestern Lines.....	June 6 mos.	261	559,868	784	126,713	6,056	1,253,826	1,479,212	82.4	1,521	31,927
Seaboard Air Line.....	June 6 mos.	3,611	587,457	237,797	82,940	33,621	273,118	667,580	113.7	80,243	280,947
Southern Railway.....	June 6 mos.	1,784	1,572,492	24,999	1,658,097	216,811	79,641	497,502	67.0	547,065	152,786
Alabama Great Southern.....	June 6 mos.	315	8,788,220	103,617	9,227,859	1,020,343	1,440,429	455,538	2,855,739	1,239,594	1,828,849
Ciun, New Orleans & Texas Pacific.....	June 6 mos.	336	6,872,766	586,174	7,912,405	1,038,682	1,445,464	149,215	2,442,661	1,442,397	411,108
Georgia Southern & Florida.....	June 6 mos.	397	130,023	24,881	171,200	32,941	43,030	1,846	157,807	1,213,593	1,161,953
New Orleans & Northeastern.....	June 6 mos.	204	1,066,977	104,851	1,265,815	151,446	125,875	153,533	168,864	1,137,509	1,160,067
Northern Alabama.....	June 6 mos.	100	50,905	1,795	53,609	11,777	1,544	1,219	32,293	74.9	89,717
Southern Pacific.....	June 6 mos.	8,773	10,713,652	1,999,677	13,761,015	1,265,805	2,092,812	53,278	309,417	1,942,463	1,518,444
Texas & New Orleans.....	June 6 mos.	4,429	16,315,760	9,676,744	68,140,550	6,933,869	12,111,750	8,336,342	5,031,105	1,120,916	1,121,121
Spokane, Portland & Seattle.....	June 6 mos.	946	2,434,954	1,577,422	19,364,750	2,683,303	3,839,266	733,386	615.5	3,048,330	2,419,034
Tennessee Central.....	June 6 mos.	286	1,059,572	31,971	1,159,936	196,480	266,663	51,149	1,122,123	1,122,397	2,221,516
Texas & Pacific.....	June 6 mos.	1,949	1,825,158	256,867	2,261,833	256,156	425,492	66,473	1,263,062	1,133,947	1,125,529
Texas Mexican.....	June 6 mos.	1,949	10,734,772	1,148,739	12,939,937	1,467,141	2,53,184	444,848	3,982,606	9,038,661	76,742
Toledo, Peoria & Western.....	June 6 mos.	162	78,749	466	88,396	14,281	3,481	34,565	82,851	94.9	77,397
Utah.....	June 6 mos.	239	61,097	2,723	67,709	110,487	9,180,3	210,032	42,210	202,869	167,566
Union Pacific System.....	June 6 mos.	9,824	9,029,359	1,555,014	11,711,825	1,250,894	2,199,909	3,591,013	51,340,185	178,2	14,340,910
Virginia.....	June 6 mos.	619	53,574,931	6,333,440	65,681,095	8,408,917	13,846,428	1,977,505	22,470,611	13,036	167,308
Wabash.....	June 6 mos.	2,447	19,338,367	1,181,788	22,181,125	2,609,648	4,112,456	2,726	127,625	118,892	13,765
Ann Arbor.....	June 6 mos.	293	300,789	3,229	1,178,677	112,153	238,675	19,041	1,247,64	1,245,128	117.3
Western Maryland.....	June 6 mos.	882	1,851,460	16,647	21,386	8,197,903	619,558	1,479,212	110,745	1,41,514	144,659
Western Pacific.....	June 6 mos.	1,207	5,67,231	192,182	7,300	1,253,826	2,64,187	672,263	145,878	3,02,401	3,02,401
Wheeling & Lake Erie.....	June 6 mos.	511	1,220,715	39,385	7,845,383	975,829	1,739,524	211,173	1,99,985	5,23,158	66.7
Wichita Falls & Southern.....	June 6 mos.	203	45,966	752	53,966	8,361	6,178	1,553	14,250	20,577	14,757